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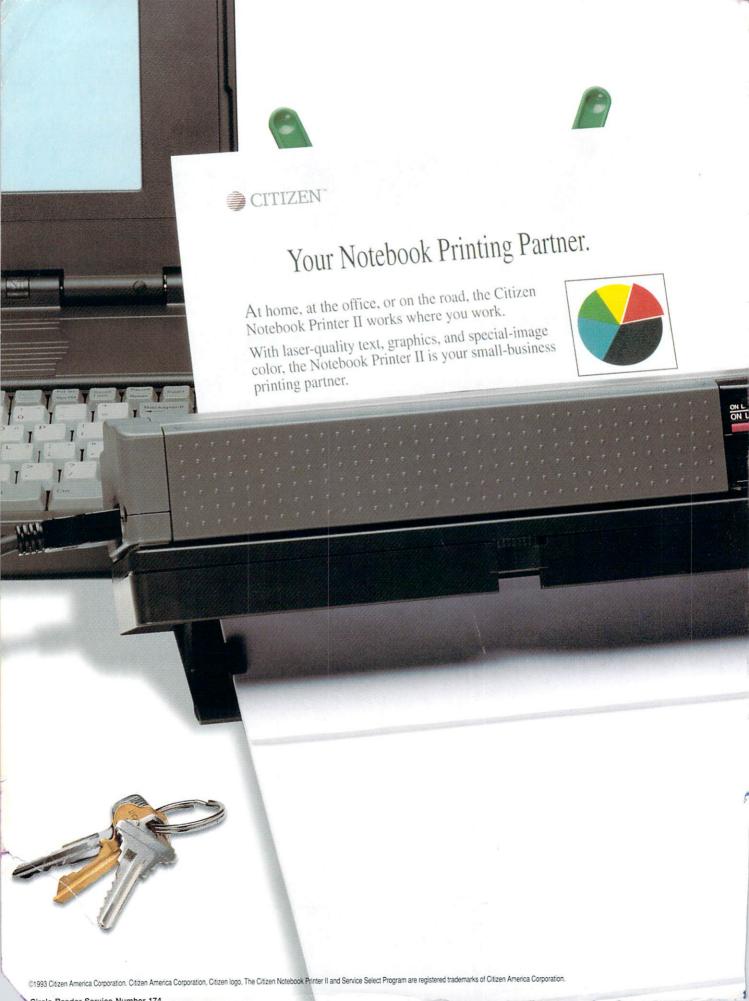
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# UMPUTE

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# COMPUTE

VOLUME 15, NO. 11, ISSUE 158

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Computer illustrations for the new Multimedia PC section by Rob Schuster.

New in this issue of COMPUTE is the first installment of a regular special section on multimedia, called Multimedia PC. To get started with our new Multimedia PC section, first turn to "Fast Forward" on page 77 for a look at the hot-off-the-press MPC Level 2 standard and an explanation of what it means to you. Then flip over to page 78 for our feature, "Open Windows to Sound," and get the scoop on just what's involved in adding sonic splendor to Windows. Next, take a look at "New Multimedia Products" on page 86 for info on leading-edge multimedia hardware and software. And finally, turn to page 100 for "Multimedia Spotlight," which tells you how to turn your multimedia PC into a Karaoke machine. So buckle your seat belts, turn to the Multimedia PC section, and crank up the volume on your PC.

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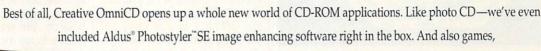
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# EDITORIAL LICENSE

Clifton Karnes

OMPUTE's been a pioneer in multimedia since day one. In fact, way back in July 1991, we started the first monthly computer magazine column we know of devoted to multimedia. Since then we've regularly covered multimedia in features. Test Labs, and reviews.

This month marks another milestone in our multimedia coverage. Starting with this issue, we're including a special section called Multimedia PC in each issue. In this section. you'll find "Fast Forward." a column written by COM-PUTE's multimedia expert. David English: a feature: a new-products section; and an in-depth review we're calling "Multimedia Spotlight."

Each Multimedia PC section will kick off with the "Fast

networking are in our future and yours.

Multimedia and



Forward" column, which will take a hard look at what's new and what's just around the corner in multimedia technology. If you want to get the scoop on the leading edge, look here. In this issue, David's column focuses on the new MPC Level 2 specification and why it's the way to go. Don't buy a new multimedia PC or upgrade kit until you've read about the latest standard.

cover everything from handson help to buyer's guides. This issue's feature, "Open Windows to Sound," tells you what to look for in a sound card and speakers, with details about the best equipment. including both MIDI and highend studio applications.

"New Multimedia Products" will cover the latest available hardware and software—the stuff you'll probably have read about a few months before in "Fast Forward." For details about what's new and noteworthy, turn here.

The last article in our multimedia section will be "Multimedia Spotlight," a review of the coolest MPC product we've seen for the month. The first "Spotlight" takes a look at PC Karaoke. If you sing "New York, New York" in the shower but dream of bigger things, your multimedia PC may help you.

This is just the beginning. We have lots of exciting things planned. Taking just one peek ahead, if there's a multimedia aficionado on your gift list this year, don't miss our next issue's feature on great multimedia gift ideas.

Multimedia isn't the only new thing happening this month at COMPUTE. Last month, I talked a little about COMPUTE going live on America Online. I couldn't say too much about our forum then because lots of details were still up in the air; now, everything's finalized, working, and pretty nifty.

Before talking about COM-PUTE's AOL edition, it might be worthwhile to touch a little on COMPUTE's history. As many of you know, COM-PUTE's been publishing for 15 years, giving home and business PC users all the latest information about hardware, as well as productivity. education, and entertainment The multimedia feature will software, in a form that's easy to understand and easy to use.

Our online edition of COM-PUTE will offer some of the best from our regular edition. including hints and tips about everything from DOS batch files to database programming, the latest scoops on hot Windows apps and cool multimedia titles, and indepth reviews and head-tohead Test Labs.

You can get to the COM-PUTE forum on AOL with the keyword COMPUTE. When you arrive, you'll see the COM-PUTE logo in a window with several buttons and a list box filled with places to visit. The two big buttons in the upper right are for what's new in the forum. These buttons will change every few days, so check them out regularly. Other buttons let vou move quickly to popular areas in the forum: Message Boards, Tips & Tools, Software, and Text Search.

The list box contains the topics for our online articles: Windows Workshop, News & Notes, Windows Workshop, Multimedia PC, Games, Getting Started With, Test Lab. COMPUTE Ordering, and Computer Lingo.

Perhaps the most important section in the COMPUTE forum hosts our message boards. We want COMPUTE Online to be more that just an online edition of the magazine. We want it to be an interactive magazine, too. With the message boards, you'll be able to talk with COM-PUTE's editors. You can ask us and your fellow online travelers questions directly, and generally make yourself more a part of the magazine. We're looking forward to more contact with you; I hope you'll take advantage of this opportunity to let us hear what's on your mind. So link up, log on. and leave us a note.

# Mission

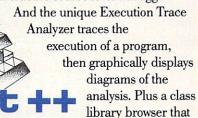
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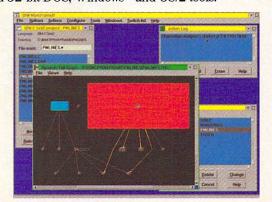
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|                             | ISO 9899:1990             |  |  |  |
| Optimization                | Global                    |  |  |  |
|                             | Inter-module              |  |  |  |
|                             | Function inlining         |  |  |  |
|                             | Instruction scheduling    |  |  |  |

# starts here.



# BUILT-IN WINDOW

hatrack. You can break down a door with it. It even makes a fair percussion instrument. Oh, and it comes with a brain inside. You can use your brain to make work simpler, or you can ignore it and use your head for a hatrack. It's the same way with Windows. Too many of us are using Windows as if it were only a brainless task switcher, good for keeping those mysterious Windows programs under some kind of control, but otherwise a memory-wasting nuisance.

Windows has so much more to offer than a shell and a task switcher, yet many of us never venture into that no man's land of advanced Windows features. Fear not! If you step off the beaten path, you'll discover that Windows has features that will make your work easier and more intuitive, your output more attractive, and your computer an even abler assistant than it was before.

This article will talk about TrueType, the Recorder, the Clipboard, and OLE and DDE. You'll find out what they are and how to use them.

Řemember, though, that not all Windows applications use all of these features. Therefore, before trying any of the options discussed here, you should check your applications' documentation to make sure they support these advanced Windows features. The examples we'll use involve Windows Paintbrush and Windows Write, since everyone who has Windows has these applications. Microsoft was kind enough to make sure that both of these so-called accessories take full advantage of the advanced features.

### **Font of Wisdom**

TrueType was developed in a cooperative effort between Microsoft and Apple Computer to establish a font technology that could be used across computer platforms (read that could be used on the Mac and the PC) and that wasn't dependent on PostScript, which is a product of Adobe. TrueType is part of a larger page description language called TrueImage, which is available in place of the PostScript language on many "PostScript-compatible" printers. The advantage of TrueType fonts over PostScript fonts for the casual user is that, without additional software (such as FaceLift or Adobe Type Manager), TrueType fonts can be printed on any printer that has a Windows dri-

ver, and they appear onscreen pretty much as they will appear on the page. This provides high-quality outline fonts for use with PCL laser printers (also known as Hewlett-Packard-compatible printers) as well as ink-jet printers, thermal transfer printers, and even dot-matrix printers and fax machines.

There's nothing new to learn about using TrueType fonts. All you have to do is make sure they're installed and active under Windows. To do this, open the Main program group, double-click on Control Panel, and then double-click on Fonts. A dialog box will open up, and one of the buttons on the right side of the box should be marked TrueType. Click on that button, and you'll see a dialog box with two options: Enable TrueType Fonts and Show Only TrueType Fonts in Applications. Make sure the check box next to Enable TrueType Fonts is checked. The available fonts will appear in the font lists of programs that support TrueType (which includes most programs released since Windows 3.1 appeared on the market).

The TrueType fonts are attractive, well designed, and easy to use, but their greatest effect has been in the area of marketing. Before TrueType, purchasing a font meant laying out major bucks. A single font could cost \$100 or more, and people who found good-looking fonts for as little as \$20 or \$30 considered themselves lucky.

Since the appearance of TrueType, the cost of fonts has diminished to the point that you can purchase professionally designed fonts for as little as \$2 apiece in packages. Many drawing programs are packed with dozens of free fonts as a premium (CorelDRAW! 4.0 alone was shipped with 750 TrueType fonts in its CD-ROM version), and you can find dozens of excellent fonts on bulletin boards and online services for the cost of downloading them (CorelDRAW! is the major reason for this; its font design capabilities are awesome).

Bear in mind that TrueType has not yet made its way into professional circles. Many typesetters require Adobe PostScript fonts and cannot yet use TrueType fonts. If you're preparing something for typesetting, be sure to find out from your typesetter what kinds of fonts to use before you start laying out your publication. Otherwise, you might be in for an unpleasant surprise—and a lot of extra work.

unpleasant surprise—and a lot of extra work.

### **By Robert Bixby**

# IS POWER TOOLS



An alphabet soup of extraordinary features comes packaged with Windows.

**Instant Replay** 

Windows' Recorder is a much-maligned macro facility. Its shortcomings were among the main reasons for Hewlett-Packard's NewWave product, which features prominent among its advantages a fully scripted macro language. The Recorder may be limited, but within its small domain, it's very powerful.

The key to using the Recorder with the mouse is that you must settle on specific positions for all the objects on your Windows desktop. The reason for this is that the Recorder understands only keypresses, mouse clicks, and mickeys. What's a mickey? It's a unit of measure for mouse movement across your desktop. The implications of this are that when you record a mouse click at a given location on the desktop, the Recorder script will remember only the click and the location of the mouse pointer. If you move the icon that was in that position when you clicked or place another icon on top of it, the Recorder macro will be useless (and potentially dangerous).

Therefore, the first step in successful Recorder use is either to construct a comfortable arrangement of items on your desktop and keep the items in that arrangement as long as you use your library of Recorder macros or to record only keypresses (this is one of the options as you begin recording a macro). Veteran Recorder users recommend recording keypresses because they're completely independent of arrangement of objects on the screen and they're much less ambiguous.

To use the Recorder, double-click on its icon in the Accessories program group. The Recorder window will appear. Pull down the Macro menu and select Record. The options in this dialog box allow you to record mouse movement and clicks, ignore mouse (record keyboard entry only), or to record everything (mouse and keyboard). You can select a key combination to assign the macro to, such as Ctrl-Z. You can tell the macro to play fast or at the same speed it was recorded, and you can make the mouse movements relative to the full screen or the window.

You can't edit a macro, but you can call another macro within a macro (to do this, you must have Enable Shortcut Keys checked in the Record dialog box; to run another macro within a macro, just press the shortcut key for that macro while recording a macro).

Let's try recording a macro. The Recorder works with any application, so let's use Write for the example.

Start up Write.

Bring the Program Manager to the

foreground and double-click on the Recorder icon in the Accessories program group.

Pull down the Macro menu and select Record.

In the resulting dialog box, type z in the Shortcut Key text box and select Everything in the Record Mouse list box. Make sure that Playback To is set to Same Application, that Playback Speed is set to Fast, that the Continuous Loop check box is not checked, and that the Enable Shortcut Keys check box is checked.

Click on Start to begin recording. The Recorder will be minimized.

Type some text in Write. A good use for a macro is to record your letterhead information so you don't have to type it out each time you write a letter. Enter your name, address, and telephone number; drag through all the text; and press Alt-P, C to center it on the page. That's enough for your first macro. Let's turn off the Recorder.

Double-click on the minimized Recorder icon. Macro recording will be suspended, and a dialog box will open, giving you the options of Save Macro, Cancel Recording, and Resume Recording. If you want, you can now take other actions that will not be recorded and then resume recording at a later time by just selecting Resume Recording. However, at this time we will save the macro for later use.

Click on Save Macro. The macro will not be saved to its own file but rather to a collection of macros. You can have as many collections of macros as you want, and each collection of macros can contain dozens of individual commands.

To save your current collection of recorded macros, pull down the File menu in the Recorder dialog box and select Save. The familiar Save dialog box will open, and you can save your macro collection with any name you choose, although the default extension for recorded macro collections is REC.

You can't edit a recorded macro (you have to rerecord the macro from beginning to end), but you can change the properties of a macro by clicking on the macro in the Recorder dialog box, pulling down the Macro menu, and selecting Properties.

Since you can't edit macros, a good strategy is to atomize them. Break a single task into several short tasks, giving each of these tasks its own shortcut key combination. Then, when it comes time to put all the short macros together into a larger macro, record a macro in which all you do is press the shortcut key combinations for the shorter macros. That way, if some aspect of your macro changes,

you need rerecord only the one or two parts of your macro that have changed, not the whole thing. Recording a long, detailed macro can be an exercise in frustration. Each time you make some small mistake, you'll have to start over again. By breaking your macro down, you can deal with it in manageable chunks.

**Cutting and Pasting** 

The Clipboard is hardly an advanced feature. It's been around since the very beginning in Windows, and most people have used it, whether they were aware of it or not. If you cut or copy something from a document and then paste it back into that or another document, you've used the Clipboard. But there are more ways to use it. For example, did you know that Windows has a built-in screen capture facility? Anytime you have something on the screen that you want to capture for posterity, all you have to do is press your Print Screen key. The entire screen will instantly be placed on the Clipboard. From there, you can save the image to disk, or you can paste it into any application that can handle a bitmap image. The only drawback of saving the Clipboard image is that you can save it only in CLP formatthe native format of the Clipboard. There are utilities (FreezeFrame by Delta Point, for example) that can convert the Clipboard file to a BMP or other bitmapped format. If you don't want to save the entire screen, press Alt-Print Screen to save an image of the active window to the Clipboard.

If you've captured a screen image to the Clipboard, you can paste it into Windows Paintbrush. Once the image is in Paintbrush, you can save it as a BMP or PCX graphic. You may have tried pasting a full-screen image into Paintbrush and been frustrated because pasting the full-screen image results in a truncated image only as large as the window in Paintbrush. There's a technique for getting the whole image in (and thanks to Clifton Karnes's 101 Essential Windows Tips for this solution): Zoom out before pasting. That way, you can paste the whole image into the reduced-size screen. Pull down the View menu within Paintbrush and select Zoom Out. Pull down the Edit menu and select Paste. The Paintbrush window will appear to be filled with a grid. Pull down the Edit menu and select Paste again. The full-screen image will appear. Pull down the View menu and select Zoom In. You can scroll all over the screen and edit it; then you can save the result to disk as a BMP or PCX file.

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| Styles               | 0                     | ٥                      |                            |
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PO Box 803 Nashua NH 03061 Or Fax Toll-Free to: 800-869-8909 a screen that's typical of your Windows working desktop, paste it into Paintbrush, save it as a BMP file, and then use that file as your Windows wallpaper. That way, you'll look busy even when you don't have a single window open on your screen.

To see what's on the Clipboard and to save or load an image, you need to use the Clipboard Viewer. which is one of the applications in the Main program group. Double-click on the Clipboard Viewer icon, and you'll see the current contents of the Clipboard. Just for fun, when the Clipboard Viewer is visible, press Print Screen and then Alt-Print Screen to see what happens to the contents of the Clipboard.

You can use the Clipboard to store information from DOS applications running under Windows. In 386 enhanced mode, you can drag the mouse pointer through a DOS application to select data to be transferred to the Clipboard. In real or standard mode, you can transfer only an entire screenful of data to the Clipboard from the DOS application.

If you're running a DOS application full screen under Windows and you press Alt-Print Screen, you'll save the entire DOS screen to the Clipboard as text. This can come in very handy.

If you're running the DOS application in a window (press Alt-space bar to switch between running the application full screen and running the application in a window), you'll see a Control menu in the upper left corner of the window. This is similar to the Control menu in Windows applications, but it has a couple of enhancements. First, it allows you to select the size of the type in the window (and therefore the size of the window itself) under Fonts. Second, it gives you an Edit option.

Pull down the Control menu and select Edit; then select Mark from the resulting submenu. Drag the mouse through some text in the DOS application to select it. Then press Enter, and the data you've selected will be copied to the Clipboard. If there is data in the Clipboard, you can paste it into your DOS application. This facility brings many of the advantages of Windows to DOS.

The only thing you can't do is make OLE or DDE links with a DOS application (not yet, anyway) or cut data from your DOS application.

Another use for the Clipboard, as you'll read shortly, is as a bridge to establish DDE and OLE links.

**Linking Documents** 

OLE is the latest linking option in Windows. The acronym (usually pronounced like the Spanish interjection olé but sometimes spelled out, O-L-E) stands for Object Linking and Embedding. OLE goes beyond its precursors, DDE and pasting from the Clipboard, in that instead of simply pasting a value in a document, it pastes the entire application in the document. That's a lot to comprehend, so take a moment to consider the possibility of having all of Quattro Pro as part of an Ami Pro document, or all of Paintbrush as part of a Write document. Now that you've considered it, let's do it.

Start up Paintbrush and Write. In Paintbrush, draw an image. It doesn't have to be anything fancy-just a rectangle or two of different colors would

Save your drawing (saving the file containing the linked object is crucial to the process).

Drag a selection rectangle that encloses the drawing you just created. Pull down the Edit menu in Paintbrush and select Copy to place a copy of the image on the Clipboard.

Click on Write. Pull down the Edit menu and select Paste Special and



then Paintbrush Picture Object. The contents of the Clipboard will be pasted into your Write document. But there's more.

Close down Paintbrush so that all you have running is Write with the linked object in it.

Double-click on the linked object. If all goes well, Paintbrush should have started up, with the linked object in its window, ready for editing.

How could you use a property like that? Imagine that you're designing a letterhead. Part of the design is the logo for your company. The logo committee is driving you nuts by changing the logo constantly. By having the logo and the drawing program inside the letterhead itself, you can save time when changes come through by making them right in the document itself instead of making them in some separate document and then going through the steps to update the changes in the final document.

DDE is an earlier version of OLE. It's not as well supported as it used to be and may be fading from use, but enough software still uses DDE that it's worth mentioning.

Although it sounds like the latest insecticide or mind-altering chemical, DDE was actually the first serious advance associated with Windows. It appeared with Windows/286 and Windows/386, and it allowed specially designed Windows applications to communicate with each other.

DDE stands for Dynamic Data Exchange. When it's used, it allows you to move information from one application into a document created by another application. Sounds like cutting and pasting, doesn't it? Well, it goes a step beyond that. The information pasted into the new document is permanently linked to its origins. When data in the original application changes, the document into which it has been pasted is also updated. Is that clear? Maybe an example will help.

Suppose you're preparing a 50-page annual report. Deadlines are tight, and the data in the spreadsheet keeps changing as information is being fed in from your many branch offices around the world. How will you know that the final information is in place when the document is sent to the typesetters? If you guess DDE, give yourself a star. When you link the bottom line in your spreadsheet to the gross earnings line in your text document, you'll know that when the final figures are in place, they'll also be completely up-to-date in your annual report.

Let's use DDE to see how it works. Once again, we'll use Windows Paintbrush and Windows Write to demonstrate the principles, but you could use most DDE-compliant software to create an example of your own.

Start up Windows Paintbrush. Draw a circle of one color and then a rectangle of another color. Save the painting to disk.

Drag a selection rectangle that encloses the entire drawing and select Copy from the File menu. The drawing is now on the Clipboard.

Start up Windows Write. Pull down the Edit menu and select Paste Link. Now when there are changes in the graphic in Paintbrush, they will be instantly reflected in the document in Write.

### **Use Your Head**

Now that you know a little about what can happen in the background, you should never mistake Windows for a mere task switcher again. Windows is capable of even more now—with its multimedia add-ons that can make use of animation and sound.

Windows has become a deep enough product that it will repay you handsomely for any time you spend learning how the pieces fit together. Remember: Use your head for something besides a hatrack—and put Windows to work every chance you get.

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Edited by Mike Hudnall Reviews by Richard C. Leinecker

oes your present computer setup allow you to be as productive as you can be? With each new generation of hardware and software, this is a question you've got to ask if you want to maintain a competitive edge. The arrival of stand-alone fax machines provided a tremendous productivity boost. Then computer fax cards entered the work scene, offering ease of use. even more convenience, and even greater productivity benefits. Now these cards are faster. less expensive, and more capable than ever; and a number of companies are ready to take advantage of this market by offering fax packages, many of which have OCR capabilities.

The benefits of computer faxing were clear to me from the first day I used one of these packages. For months I wrote messages in Microsoft Word, printed them on my LaserJet, faxed them from the machine, and then threw them in the garbage. After my garbage can filled up enough times. after my LaserJet needed a new toner cartridge, and after I forgot to resend enough faxes after busy signals, I looked for a better way. The complete solution to all of these problems was my fax board and fax software. This month's Test Lab covers ten of

BILLEN POR PROPERTY OF THE PRO

the best Windows-based fax software packages on the market.

Using this technology begins the transition to a paperless office. Instead of printing to my LaserJet from Word, I now print to the fax board. I select the fax board from the Windows printer setup. Then, every time I print, the document routes to the fax board. No more full garbage cans and depleted toner cartridges from faxing!

Getting busy fax machines doesn't bother me. I simply schedule outgoing faxes and let the software worry about trying again later. No more irate phone calls asking where the fax is!

These fax packages do a lot more than I need. But some of you are probably looking for just such capabilities. You can set up software to send documents on a regular basis. Let's say, for example, that you have a sales staff that needs current inventory and pricing information daily. Every day at 5:00 a.m., your fax software can dial them all with the correct information based on a file on your hard drive.

If you have several people onsite who all get faxes, you'll find this feature helpful: Fax software gives you the ability to set up separate incoming boxes. This makes it possible for each person to print out his or her own faxes. That's good because you don't have to worry about a fax's going to the wrong desk and lying there for weeks. Another advantage is the security that's provided to each person. Sensitive faxes aren't open to unwanted eyes.

If you do have something on paper that you need to fax, you'll need a scanner, too. Most of the packages easily import from scanners. Here again, the fax-card-

BitFax Easy-\$89

BIT SOFTWARE 47987 Fremont Blvd. Fremont, CA 94538 (510) 490-2928 and-software solution is better than the old way. Once you have a document scanned in, you can load it into your favorite paint program or work with it using the fax software's built-in graphics tools. If necessary, you can use optical character recognition to convert a fax to editable text.

I still have my dedicated fax machine. For the types of incoming faxes I get, it's ideal. But for my outgoing faxes, you won't catch me using it. Once you take a close look at the packages in this month's Test Lab, you may decide that they can solve many of your communication problems, too.

RICHARD C. LEINECKER

### **BITFAX EASY**

Many of you grew up on BitCom, the terminal program that at one time seemed to come with most of the modems sold. The same folks who developed BitCom applied their telecommunications skills to the next logical step—fax software. If you're accustomed to BitCom, you might learn to use BitFax without much difficulty. It occupies a middle point between older DOS-based software and hardcore Windows technology.

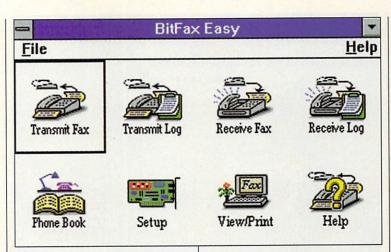
I know people who won't touch Windows software unless it follows every standard Windows interface technique in existence. I also know people who're used to DOS software and need the chance to ease into Windows. Bit-Fax bridges the two extremes. It doesn't completely follow the Windows interface standards, using a smaller-than-usual screen and 2-D, rather than 3-D, buttons, for example. On the other hand, the program doesn't stay strictly with old DOS-style techniques. This is neither good nor bad; just be sure that this is what you want before you consider BitFax.

This version of BitFax includes an advanced OCR technology called Caere AnyFax technology. In the three programs I tested that use it, this OCR technology produced admirable results. The scores for these programs were about as good as the scores for any others. In my benchmark test, BitFax scored 77 percent. That's outstanding, especially considering that the benchmark test has some built-in procedures that lower the scores. You won't have any trouble using the files it saves as long as you're willing to spend a few minutes editing the few characters that go awry.

BitFax's fax viewer didn't have many features, but of the viewers covered in this roundup, this one was probably the easiest to use. Buttons and pull-down menus let you easily rotate, scale, and page through the fax document. For most people, this is enough—and the viewer is truly easy to use.

With most of the fax packages, you have to identify the card you're using. With BitFax, I didn't have to. Some of the features I looked for were missing from this package. I couldn't find a way for incoming faxes to automatically print, nor could I find any scanner support. Also, there didn't appear to be any way to import and export phone book lists—a capability you'd really miss if you already have your phone numbers and addresses in electronic





format. However, even these omissions don't prevent BitFax from being a good choice for a number of people. And this latest version of the software installs more easily than the previous version, has improved documentation, and now comes with BitCom, a terminal program.

If you want software that sends faxes, receives faxes, and does OCR conversion, and if you don't need your fax software to do anything else, this could be a good choice for you. Particularly if you still feel more comfortable with DOS-based software, give BitFax a look.

Circle Reader Service Number 371

### DATAFAX 4.01

This is no ordinary fax software. The designers at Trio made sure DataFAX went beyond other fax software by including extras that most people don't even think of. Besides working on my standalone system, it's network ready. Cover pages can be converted to

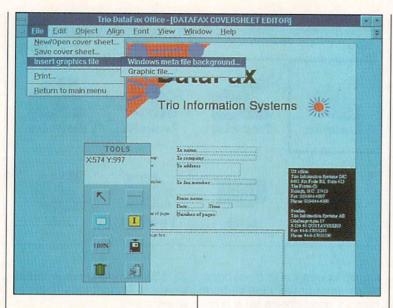
DataFAX 4.01—\$129

TRIO INFORMATION SYSTEMS 8601 Six Forks Rd., Ste. 615 Raleigh, NC 27615 (800) 880-4400 (919) 846-4990 28 different languages. A slightly different fax protocol needed when communicating with German fax machines can be turned on. And the OCR conversion process exports to a number of popular word processor formats.

All of the features you'd expect are there. You get background sending and receiving, OCR conversion, graphical editing tools, and scheduled transmissions. They're all admirably implemented; just click on a button or menu selection. DataFAX uses more buttons with icons than the other fax software. Although it took me a bit longer to learn what each one represented, once I did, the interface was very easy to use.

In examining DataFAX, I received the impression that the designers didn't look at other fax software during the design process. They seemed to start from scratch as they created their idea of the perfect fax software.

During the installation, as DataFAX copies each file to the hard drive, a message tells you exactly what the file does. I've never seen an install program do that, but it sure was a nice change. Also, that the software which runs on my system is network ready distinguishes this product from other fax packages. Most companies charge plenty for their network versions. The international sup-



port, something else not found in the other fax software, may find favor with you if you do much overseas faxing. Sending a cover sheet to Paris with French titles is pretty impressive.

Here's another feature you might like. DataFAX has the regular front-end program like all the others, but there's a special smaller version called Captive that can be loaded and always stays on the screen as a small window, ready to be called upon when needed. Clicking on the button activates it and gives you several other choices that let you do quick operations such as sending a fax note or capturing part of the screen to fax. You can even drag files from the File Manager to it, and it will send them as faxes!

The OCR conversion of faxes to text worked adequately. The nicest part was the ability to save the files in ASCII, Excel, Word, Lotus, WordPerfect, and Ami Pro formats.

Changing program configuration is easy. Menu entries take you right to dialog boxes that let you change any part of the program's setup. That's important because it can be hard to match the setup to your fax/data modem card the first time. For most of the fax software, I needed at least two or three tries. You'll be glad you can change the program configuration if things don't work the first time around.

DataFAX is a fine piece of software. It performed well for me on a stand-alone PC. If you need network capabilities or do a lot of international faxing, that might tip the scales for you in the direction of DataFAX.

Circle Reader Service Number 372

### DELRINA WINFAX PRO 3.0

After spending time with Delrina WinFax Pro, I could just imagine the planners and developers sitting around thinking about what they could possibly include in this latest version so that it would top the previous version. The resulting package, if not the absolute best, is pretty close. During

Delrina WinFax Pro 3.0-\$129

DELRINA 6830 Via del Oro, Ste. 240 San Jose, CA 95119 (800) 268-6082 the testing, I opened the manual for a total of 2 minutes. After that, I read for 20 minutes to make an assessment for my rating. When something this complex doesn't need a manual, it says a lot about the software.

All of the standard features are there: background sending and receiving, scheduled transmissions to individuals or groups from one of the phone lists, OCR conversion to text files, and graphical editing tools. These features deserve more than casual mention, because they're the result of years of hard work. But in this day and age, we expect outstanding software—so I'll go on to mention the exceptional points.

WinFax Pro uses a third-party technology called Caere AnyFax technology. The three programs in our roundup that use it performed OCR conversion about as well as any of the other fax programs. Bear in mind that the comparison program I used had some built-in procedures that tend to lower the score from 100 percent, even for perfectly matched files. Yet WinFax Pro came up with a 68-percent rate of conversion, more than adequate to convert faxes to usable text files.

If you'd rather skip the frills, the next part won't interest you. But most of us will appreciate that Win-



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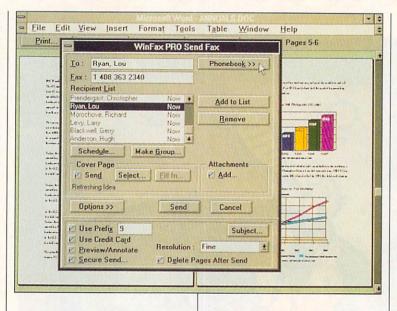
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Fax Pro's cover sheets transform boring and easily lost faxes into experiences that people can't ignore. I counted 105 different cover sheets, all customizable. The next time I can't get results from some company's tech support. I'm going to send the cover sheet with Shakespeare saving "It would be a tragedy if the following went unread." And for collecting past due invoices. I'll use the one with a guy on a ledge saying "We're getting desperate! Please drop us a check!" In all seriousness, cover sheets like these aet results.

Another feature I liked was the ability to show thumbnails of all pages of a document. This can be a great help if you want to make sure your presentation has the right overall effect.

Most fax software defaults to automatic answer and reception. WinFax Pro is different. When it's installed, it doesn't automatically answer calls. This small touch might seem insignificant, but wait until your phone line is doubling as a fax and you lose several calls because a caller gets a carrier signal. All of the programs can turn automatic answering off. WinFax Pro's choice of defaults demonstrates a real understand-



ing of how the software is used.

The install program does its best to identify your fax/data modem board and its COM port. For mine, it guessed Class 1, but then I couldn't send without transmission errors on the remote end. I had to reinstall the software to make the change. In the next version of WinFax Pro, I'd like to see the ability to make such a change without reinstalling the software.

As for background operations,

I noticed only slight hiccups. There weren't any of the delays I experienced with many of the other packages. I had no trouble running other applications while Win-Fax Pro was in operation.

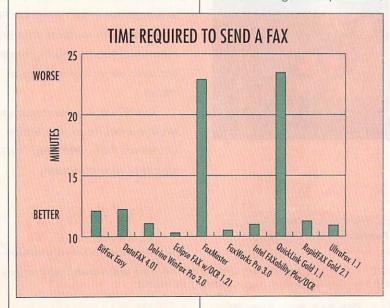
When I evaluate software, usually there are dozens of features I'd like to see added. Not so with WinFax Pro. If you're looking for power in a fax program, this is definitely one to consider.

Circle Reader Service Number 373

# **ECLIPSE FAX WITH OCR 1.21**

Eclipse FAX with OCR 1.21 takes a straightforward approach to faxing. If you aren't interested in a lot of fancy buttons and cute touches, this package could be the one you're looking for. While the developers didn't waste effort on frills, neither did they skip any important features. Everything you need to do your faxing is included.

The package sends and receives faxes manually or in the background, and it is also capable of scheduled transmissions. It lets you keep multiple phone books, use your scanner for input,



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Circle Reader Service Number 168



and view and edit faxes. I found the program's well-planned features clear and easy to use.

I frequently use faxes to contact people who haven't answered voice mail. All I need to do is to write them a note of several lines, letting them know what I need. Even the most die-hard voice-mail avoiders, it seems, respond to a fax. Eclipse FAX's Quick Note feature takes you through the simple process of selecting a name from your phone list with a double click, then typing a short note. This is consistent with the package's simple approach. Even with several other software packages installed on my computer, I came back to Eclipse FAX when I needed to send a one- or two-line fax.

Another handy Eclipse FAX feature is its ability to index a collection of faxes. With this feature, browsing or searching through your faxes is a snap. To find a particular fax, just enter a keyword that matches a keyword you typed in when the document was saved. The program also facilitates searches by offering a variety of ways of sorting information.

Eclipse FAX occasionally takes control of Windows for several seconds, most notably in the period of 15–20 seconds when it first connects to a remote fax. During transmission, there are also periods of 2–3 seconds between pages when the program takes control of Windows. It's easy to start clicking the mouse and pressing keys during these periods, but that can be trouble. Each

Eclipse FAX with OCR 1.21-\$129

PHOENIX TECHNOLOGIES Eclipse Division 846 University Ave. Norwood, MA 02062 (800) 452-0120

time you click or press, Windows remembers; and once the active application regains control, your clicks and keypresses will all be executed in rapid succession. I spent plenty of time restoring my icons to where they used to be, after numerous pent-up mouse clicks were released.

On one occasion, I used the program to convert a fax to a text file with the OCR feature. This required a great deal of processor time and involved large numbers of disk accesses. During a background send, the conversion caused an unexpected delay for the remote fax device because the remote device terminated the connection and reported a communication error. Since it happened only once, and that was during unusually heavy system use, I don't think it's a problem. My standalone fax machine occasionally can't complete a transmission for one reason or another.

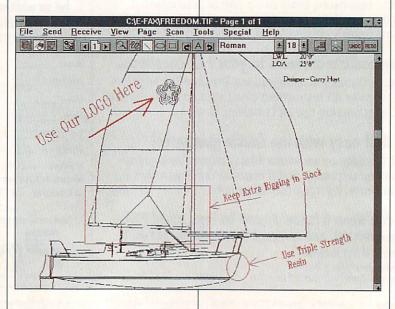
If you're the type who gets right to business and would rather forgo frills, this might be your package. I like it because it doesn't take up much disk space and it's easy to use to send a quick note.

Circle Reader Service Number 374

### **FAXMASTER**

Caere, the company that developed the AnyFax OCR technology, licensed by several other companies, has also developed its own fax software. With such a significant part of the fax technology mastered and at Caere's disposal, it's no wonder. FaxMaster is an easy-to-use alternative to the other packages. Though not as full-featured as some other fax packages, this product boasts a look and feel that may make it your first choice.

All of the important features are there and are professionally implemented. Sending or receiving faxes is simple and effortless. Scanner support, scheduled transmissions, a viewer, and a phone list provide the tools to maximize productivity. Missing are less-important features, such as graphical editing tools, the ability to import and export phone lists, and the abil-



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ity to change screen colors.

Making a complex piece of software easy to use is no small feat, but Caere has managed to do it. At the top of the screen is the pulldown menu and, below that, six icons representing the major program functions. The remainder of the screen contains either thumbnail documents from which you can select or a full view of a selected document. I like being able to select from thumbnails: it's much easier and more enjoyable to select from these miniaturized representations of faxes than from a list of faxes (usually with dates and times as their only identifiers).

Of course, Caere's OCR technology is state-of-the-art. The AnyFax technology is easily recognizable during the conversion process; you see an image of the fax page and watch the text become highlighted as the program processes it. You can also see a small window with an expanded piece of text while it's operating. FaxMaster scored a 64 percent—not the best score of the lot, but pretty good. Two factors that can affect my comparison of the OCR-produced document to the original document are pagination marks and inserted form feeds. While pagination and form feeds are useful features, they accounted for FaxMaster's lower-than-expected score in the comparison; if the pagination marks are important to you, or you need form feeds for easy printing, don't let the score diminish your appreciation of this pack-

### FaxMaster-\$109

CAERE 100 Cooper Ct. Los Gatos, CA 95030 (800) 535-SCAN

age's OCR capabilities.

The computer industry has its share of jargon and buzzwords. I easily added some of these words to the program's user dictionary so that it would have an easier time recognizing them during OCR conversion. This was helpful, since my test document had words like dBASE, Excel, and ASCII. Adding words to the user dictionary that commonly appear in faxes will improve accuracy.

Most people don't adequately appreciate the value of easy access to a program's setup. After spending a large block of time with this month's fax software packages, I think I appreciate the value of this easy access more than ever. Thankfully, FaxMaster makes its setup parameters readily available from several pull-down menu entries.

I particularly enjoyed using FaxMaster, largely as a result of its easy-to-use interface and easy feature presentation. I didn't

### WHAT IS OCR AND WHY DO YOU NEED IT?

When a fax comes in, regardless of what was used to create it, it's really a picture rather than a text file.

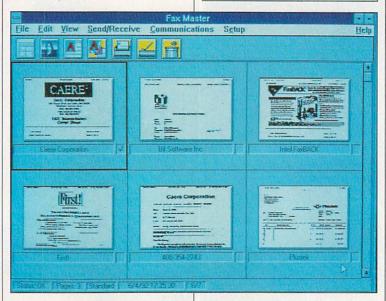
This picture can't be loaded into a word processor for editing. So, if you received a fax from someone with information that had to be faxed to someone else, you couldn't just load it into WordPerfect, make some changes, and send it on. You'd have to manually retype it, edit it, and then send it.

One other disadvantage to these picture files is that they take up far more room on your hard drive than text files. That might be a problem for you if you're anything like me. My hard drive is constantly full!

Optical character recognition (OCR) has been developed to the point that it can solve these problems by converting a picture file to an AS-CII or word processor file. Many of the fax packages have this capability built in, and it adds a powerful tool to your fax manipulation arsenal. Now you can convert the incoming data to text files and use your word processor to edit them.

OCR isn't perfect. You'll be disappointed if you expect 100-percent accuracy. But correcting a few errors is surely better than retyping an entire document.

-RICHARD C. LEINECKER







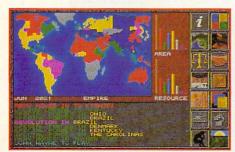




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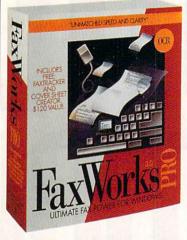


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open the manual until it was time to rate it. There were no setup problems, so I was up and running in less than five minutes. Take a serious look at FaxMaster. Its strong points might make it just what you need.

Circle Reader Service Number 375

### **FAXWORKS PRO 3.0**

The programmers at SofNet really know fax technology. Their install program found out practically everything about my fax/data modem card. I learned things about it that weren't in the manual, including the chip type and revision number.

FaxWorks Pro 3.0—\$129.99; \$64.99 for lower-end version without OCR and advanced fax management and annotation tools

SOFNET 380 Interstate North Pkwy., Ste. 150 Atlanta, GA 30339 (800) 4-FaxWorks (404) 984-8088

This mastery of the technology translated into worry-free fax sending and receiving.

The features you'd expect are there: sending and receiving, OCR conversion to text files, phone lists, scanner support, and an easy-to-use viewer. You'll also find one of the best cover page creation utilities, which includes hundreds of clip art images.

If you don't want to waste time trying to correctly configure your fax software, or if you're afraid you'll never figure it out and might really mess something up, FaxWorks Pro's easy installation makes it a good choice. By contrast, I spent several days configuring, reconfiguring, and reinstalling some of the other software to get everything working. That's a lot of time for someone who's competent and computer-literate.

There's one feature in this package that I've never seen in any other software, and that's a quick way to access system configuration files. Using a pull-down menu, you can view and edit your WIN.INI and WORKS.INI, among others. If I'd experienced trouble getting things to work, this might have been a valuable ability. I guess the folks at SofNet wanted to make sure their tech support people could easily help customers in case there was a problem.

The main screen in FaxWorks Pro isn't fancy, but the six icons are enough to help you navigate without much need to pull down menus. One icon calls up what SofNet calls a FaxTracker, which is a general fax maintenance window. What I liked best about this screen was the array of radio buttons at the top that change it from a send log to a receive log to the file access dialog box to the file cabinet. When you click on these buttons, the function of the FaxTracker changes, but you

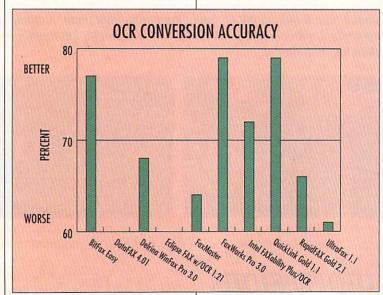
### OCR CONVERSION ACCURACY

Each of the fax packages received a ten-page document with nothing but straight ASCII text. There were no lines or other marks that couldn't be converted to text. The faxes were then converted to text files and compared with the original document from which the faxed printout was made.

The program that I used to compare the files employs some procedures that make it impossible for any of these fax products to score 100 percent. Files that are identical to the original document score 92 percent, so any score close to that is pretty good. The best score was 79 percent—good enough that some quick editing gave me a usable file.

For my own curiosity, I tried a handwritten note as well. None of the OCR technologies in these fax packages scored better than 1 percent. I guess we're still at least a few years away from OCR technology that does well with handwritten files.

-RICHARD C. LEINECKER





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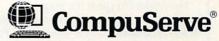


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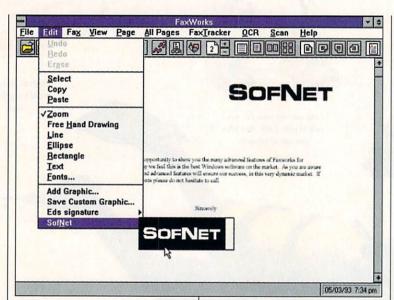
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don't have a different dialog box. That means you don't have to learn four different windows or dialog box styles for these four different program segments. Consequently, the interface reduces the learning curve immensely.

One attractive feature that Windows newcomers in particular will appreciate is FaxWorks Pro's great system of context-sensitive help. There are two levels: one that simply gives you a single line of text and another that gives you large cue card-style blocks of help. In either case, you'll get plenty of help while you're learning the software. I found the comprehensive help that's accessed from the Help menu very complete and well written.

The OCR technology performed admirably. It scored 79 percent, making it one of the best I tested. It wasn't fast, and there wasn't a snazzy display while it operated, but with results like that, who cares? With a few minutes of editing, my conversions were perfectly usable.

FaxWorks Pro gave me troublefree service. It doesn't have a lot of fancy features, but it has everything you'll probably need.

Circle Reader Service Number 376

# INTEL FAXABILITY PLUS/OCR

Intel FAXability Plus/OCR is a solid piece of software from a company famous for world-class microprocessors. It has a moderately long feature list, and I found the interface workable, but the installation involved more effort than I had planned on. Probably its most distinctive feature, and the one that may sell you on the product, is its ability to convert faxes to popular word-processing formats.

The major features are there—background receive and send, OCR conversion to text files, scanner support, phone lists, and custom cover pages. Some lessimportant features are missing, such as automatic printing of incoming faxes, automatic fax cleanup, graphic editing tools, and the ability to change screen

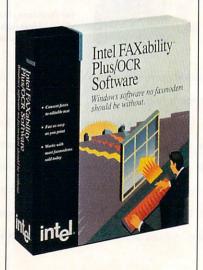
Intel FAXability Plus/OCR—\$129; \$79 for version without OCR

INTEL P.O. Box 14070 Portland, OR 97214 (800) 538-3373 colors. Of these missing features, the automatic fax cleanup is the only feature I use occasionally in the other fax packages. FAXability does include some features not found in the others. You can print faxes in landscape or portrait mode and load different printer fonts, for example.

The OCR conversion performed well. My benchmark test measured OCR accuracy at 72 percent. Other measures of OCR accuracy would probably be better than 80 percent. The benefits of OCR here, as in other packages covered this month, are clear. You can use the text files created from the faxes as you would any other documents, or you can use them as records of the faxes from which they derive.

The amazing thing about the FAXability OCR conversion process is the enormous variety of formats it outputs to. You can convert faxes not only to straight ASCII files but to compatible files for most major word processors, including Microsoft Word, Microsoft Write, Ami Pro, PFS Professional Write, WordPerfect, WordStar, and XyWrite. And that's a small part of the list. It also converts to dBASE, Microsoft Excel, and Lotus files.

I had a tough time getting the software to work on my system. After I had sent a fax, my mouse became erratic and Windows lock-



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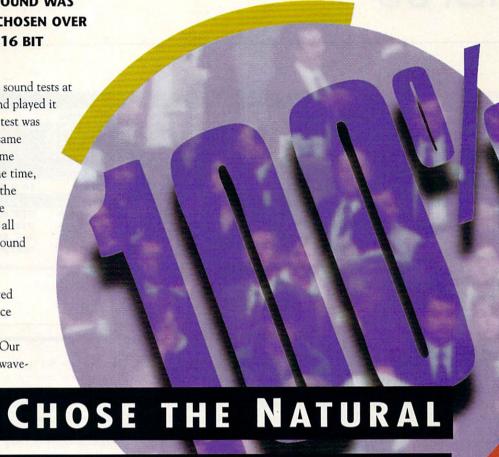
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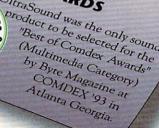
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# TEST LAB

ed up. I tried a multitude of reconfigurations, and this took quite a long time, since a complete system restart is necessary with each new configuration.

I finally called an Intel technical support representative, who solved my problem. My COM ports in Windows were set up in such a way that a conflict was created between COM 3 and COM 4. I never understood this entirely, since I don't have a serial port on COM 3 (my communications card was COM 4). I spent about five minutes explaining to the technician why the problem wasn't my mouse driver. He eventually checked with someone else and told me how to change my Windows port settings. This did the trick.

I should have stopped there. The technician recommended I download a newer version of the program's CAS driver. I did, and things stopped working. To get my system working properly again, I had to delete the directory and reinstall the software. Granted, fax software is difficult to support, but no other fax packages reviewed here had problems with my Windows port settings.

Some of the features FAXability has might be important to you. You might need to save faxes in

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| (Inbox): 1 of 5 events selected.     |                               |   |   |  |  |

your word processor or spreadsheet format. Once configured properly, the software worked well. Just keep in mind that you may have to spend some time getting it to work the way you want it to work.

Circle Reader Service Number 377

#### **QUICKLINK GOLD 1.1**

When this program first ran, I did a double take. It looked like a DOS-style terminal program with some Windows-like icons at the top. Looks can be deceiving, though, and I quickly grew attached to this software. More than just fax software, QuickLink Gold 1.1 is a complete telecommunications package.

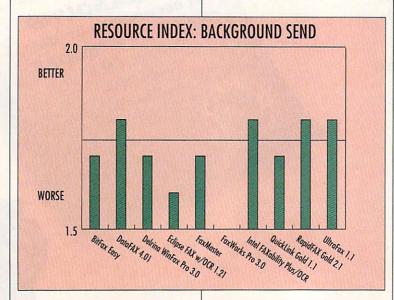
The designers and developers deserve special mention for their

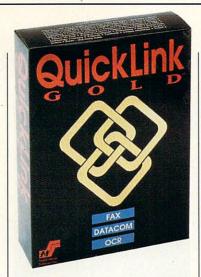
#### RESOURCE INDEX: BACKGROUND SEND

This test was performed by selecting a fax board as the default printer and then printing the first ten pages of a document from Microsoft Word. The fax software prepared the documents, then dialed out and sent them. The test started when the dial-out was initiated and ended when the remote fax signaled an end to the transmission.

In this test, the number recorded is an index of the amount of processor time available for applications other than the fax program running in the background. A perfect score would be 2.0; however, even with the background fax software idle, only a score of 1.9 is achievable, since Windows performs a number of background functions. The best score any of the fax software products achieved was 1.8.

The columns in the accompanying chart reflect the relative performance of the ten fax software products covered in this Test Lab. A high score means that you won't constantly experience slowdowns during background sends.





willingness to go against the grain. In several noticeable places, the interface deviated from what you'll find in every other Windows program in this roundup. The main screen is black with green text, in contrast to the normal Windows look and feel. After my initial surprise, I was thankful. When returning from the program's other windows with the typical Windows look, such as the fax viewer and setup dialog boxes, I always knew when I was home at the main screen. Other very nice touches were 3-D text and a modem LED simulation in the status box on the screen.

QuickLink did especially well converting faxes to text files. In my benchmark test, it scored 79 percent. However, QuickLink keeps track of its own success rate and registered a score of 92 percent. These two scores are different because the program counts only the unrecognizable characters, not the ones it gets completely wrong. The reality of QuickLink's success with OCR lies somewhere between my score and the program's—which is pretty remarkable.

Hats off to QuickLink for determining my exact hardware configuration on the first try. It worked perfectly from the start, and I never gave it a second thought after that. I don't guarantee you'll have the same success rate; I do, however, think that my experience

QuickLink Gold 1.1-\$99.95

SMITH MICRO SOFTWARE 51 Columbia Aliso Viejo, CA 92656 (800) 964-SMSI

with QuickLink speaks very well for the product, especially in contrast to the difficulties I had with other installations.

I was surprised by the amount of time the program required to send a ten-page document: It took 23 minutes and 28 seconds to send a simple ten-page document from Microsoft Word. That's double the time required by most of the other packages. There's probably a technical explanation for this, but I don't know what it is. You might not care, though. Since the send procedure goes on in the background, it won't stop you from working. If you're not constantly sending faxes, this probably won't be an issue.

I know this isn't a review of telecommunications software, but I'm dying to tell you just a little about that part of the program. Besides, some of you might want to get this program because it can serve all of your communications needs, not just your faxing needs. There's a built-in host mode. You can leave it running and dial in to access any file on

your computer. All of the major file transfer protocols, such as XMODEM, YMODEM, and ZMODEM, are built-in. And you can define macro keys to skip some of the steps when you log on to BBSs and online services.

QuickLink is a fine piece of software. It'll fill most of your telecommunications needs. On my system, it worked well, without any fuss—and that's worth a great deal to me.

Circle Reader Service Number 378

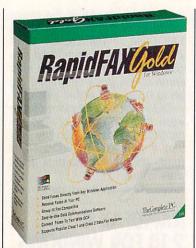
#### RAPIDFAX GOLD 2.10 FOR WINDOWS

As soon as you run it, you can tell that RapidFAX is strictly business. Greeting you as the program opens are its three most important sections: the send log, the receive log, and the phone books. It was quite a while before I found it necessary to pull down any menus, since the icons and information in the windows are enough to help you do just about anything you might need to do with this program.

All the features you need for productive faxing are there—scheduling transmissions, OCR conversion, phone lists, scanner support, and cover sheets. RapidFAX lacks some infrequently used features, such as fax-editing tools,



# TEST LAB



automatic fax cleanup, and the ability to import and export your phone lists. For most small businesses, there's more than enough to meet communications needs.

The OCR conversion utility was up to snuff. It scored a 66 percent, more than adequate for reading and understanding later. With a little time and effort, the text files could easily be edited and reused or resent later.

Another plus is the ability to import and export different types of file formats. You can load any BMP, PCX, or TIF file and send it as a fax. That's really great, because you can capture just about anything in Windows and save it as PCX and BMP files. You can easily send presentation pages that include graphs and charts.

There's a built-in memo function that quickly allows you to send a memo to a destination fax without having to load a word processor. I use this feature about as much as any other and am grate-

#### RESOURCE INDEX: BACKGROUND RECEIVE

As with the background send, an index was calculated demonstrating the processor time available for other applications. The closer the number is to 2.0, the better. The time elapsed during the receiving of the ten pages was not recorded, since the sending fax device determined how much time was needed.

RapidFAX Gold 2.10 for Windows— \$129; \$79 for version without OCR or modem software

THE COMPLETE PC 1983 Concourse Dr. San Jose, CA 95131 (800) 229-1753

ful for its inclusion. There's also a function that checks the integrity of files. I never found any inconsistencies in mine, but if I were having problems, this might be at the top of my list of favorite features.

Most computers come with the first two COM ports occupied by a serial port and a mouse. This is the case with my system and most systems I've used in the last three years. (The bad part is that my manuals that explain how to reconfigure those serial ports are always lost.) This configuration is a problem with RapidFAX, since it installs only to COM 1 or COM 2. And to further aggravate the situation, I didn't know any of this until after I installed it and tried to reboot. The memory-resident software that loads from AU-TOEXEC locked up, since I didn't have a fax/data modem card on COM 1 or COM 2.

To make a long story short, I

#### **HOW FAXES WORK**

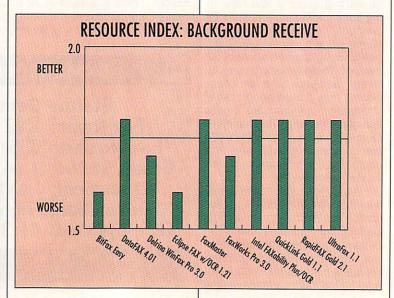
Fax communications tend to be pretty one-sided, as one fax device transfers information to the other. Here's a brief description of how two fax devices observing standard protocols talk.

The sending device dials another fax device, which automatically answers and sends a 2100-Hz tone back. For the musically inclined, that's a slightly sharp C three octaves above middle C. This tone confirms that a fax machine has been reached and not a voice line or another machine type.

The called fax device sends an identification packet at 300 baud. This packet contains all of the fax device's capabilities. The calling device sends a packet with the capabilities it selects for the exchange. Then the calling device sends a high-speed training signal, and the called device sends a message indicating that it's ready.

All of the information is sent from the calling device, punctuated by short training messages. After all pages have been sent, the calling device sends a message indicating the end of transmission. The called device sends a confirmation. Finally, the calling device sends a disconnect signal, and both units disconnect from the phone line.

-RICHARD C. LEINECKER





Ages 7 and Up

Just grab your mouse and start building! This amazing 3-D design studio lets you create houses, forts, gazebos, and all sorts of structures with electronic building blocks that click into place. And with Kid CAD, building is only the beginning. You can paint and decorate everything in sight, including the kitchen sink! Then fill your

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Kid CAD's 3-D Virtual Environment lets you change your perspective. View your house from the backyard or peek through the front door. With the simple click of a button you can zoom in or out, switch from a bird's-eye view to eye level, or circle around to see your house from a different angle.

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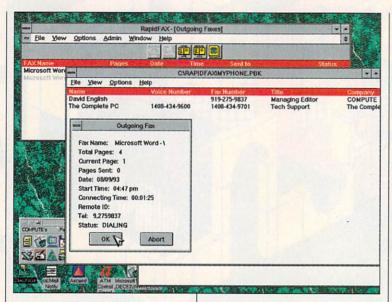
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Circle Reader Service Number 106

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# TEST LAB



spent six hours changing the jumpers in my computer, reinstalling the software, and fixing the problems the process created. If you're considering RapidFAX, make sure that your fax/data modem card can easily be configured for COM 1 or COM 2.

Another battle that I faced was finding the right fax/data modem type so that there wouldn't be any transmission errors. Generic Class 1 and Generic Class 2 didn't work, so I resorted to trial and error. It wouldn't have been so bad if the changes went into effect right away, instead of after the next time the system booted. After a number of tries, I determined that the BOCA 14.4 setting worked well (for my TwinComm fax/data modem.)

If you have a fax/data modem card that's been around for some time, chances are that it'll be on the list. That means you won't encounter the same problems I did. And if your device is on COM 1 or COM 2, you won't have any problems with RapidFAX. Since there are a number of features to recommend this program, take a look. It might be just right for you.

Circle Reader Service Number 379

# **ULTRAFAX 1.1 FOR WINDOWS**

When the UltraFax window first appears, you'll know at a glance what UltraFax has to offer and how the program is organized. Five descriptive icons with labels such as In Box and Out Box line up along the bottom, giving you access to the main program areas with a double click. At the top of the screen is a row of buttons. When the windows associated with these buttons are open, a single mouse click gives you access to choices such as Send, View, and Print. And the pull-down menus offer complete control over navigation through any part of the program.

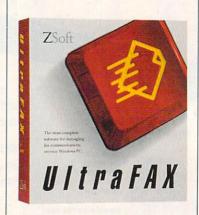
UltraFax has all the features you'd expect. Among them are scanner support, OCR conversion, multiple phone lists, and a viewer with graphical editing.

UltraFax 1.1 for Windows—\$49.95

ZSOFT 450 Franklin Rd., Ste. 100 Marietta, Georgia 30067 (404) 428-0008 There isn't room to talk about all of these, but they reveal craftsmanship and high quality. There are, however, several things which differentiate UltraFax from the other fax programs, and these differences may make this package just what you're looking for.

While working with ten fax packages, I learned to appreciate what others might call "the little things." Being able to change every part of the hardware setup without reinstalling the software became something I looked for right away. Since my fax/data modem card was new on the market at the time of testing, I had to search for just the right settings through trial and error. Several of the packages without this ability (to change the hardware settings without reinstalling the software) cost me at least an hour. And if you're a computer neophyte, an installation with one of these other packages might chew up an entire day. My thanks to the manufacturer for making sure this often-overlooked capability was included.

UltraFax also impressed me with its terrific graphical editing tools. ZSoft has long been one of the leaders in graphics programs. Most of us, at one time or another, have used PC Paintbrush, one of the first commercial-quality paint programs for IBM compatibles. UltraFax has more than enough power to add a few nice touches to an outgoing fax or cover letter or to create some



# Boldly Go Where No Math Program

Has Gone Before!

Oh no! The Trash Alien has captured Spot and left behind a trail of litter. In Trash Zapper, your mental math skills are needed to help clean up the mess.



The Number Recycler can convert trash into fuel but Blasternaut needs your problem-solving abilities to make it work. Recycle all the trash and you're ready to go!



You've tracked the Trash Alien to his home planet. But you haven't saved Spot yet! Use your mental math skills to help Blasternaut calculate his way through the Cave Runner game.



Finally, Blasternaut and the Trash Alien are face to face in the *Math Blaster* game. It's a battle of the numbers and Spot's fate is in your hands-good luck!

ath Blaster:® In Search of Spot launches the world's best-selling math program to a whole new level of learning and fun! Kids will join Blasternaut on an all-new action-packed adventure to rescue his robot pal Spot. As they search the universe, they'll boost their mental math and problemsolving skills into the stratosphere!

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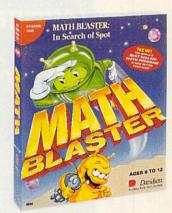
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Exciting new learning games, out-of-this-world VGA graphics, digitized speech, sound effects and music will keep kids so dazzled they'll never want to come down to Earth! And for even more variety, there are now two ways to play: focus on a single activity or take off on a mission that combines all four into one awesome learning adventure!



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Rob Bixby Compute Magazine

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Suggested retail price: \$59.95 MS-DOS

Available at Babbage's, Best Buy, CompUSA, Egghead Software, Electronics Boutique, Software Etc. and other fine retailers.



Teaching Tools From Teachers Circle Reader Service Number 151



# TEST LAB

nice artwork.

All the usual tools, such as lines, boxes, and circles, are there—even a magnifying tool! The ability to rotate your fax might be just what you need if you'd like to send the information in landscape mode instead of por-

trait. You can also view multiple pages to get a sense of what the entire fax looks like.

Several of the packages in this month's roundup had an irritating habit of taking control for seconds at a time, and UltraFax was no exception. A number of times, I'd start clicking in other windows; when nothing happened, I couldn't resist the compulsion to click some more. By the time Windows regained control, there were enough mouse events in the queue to really mess things up. Many times the result was a com-

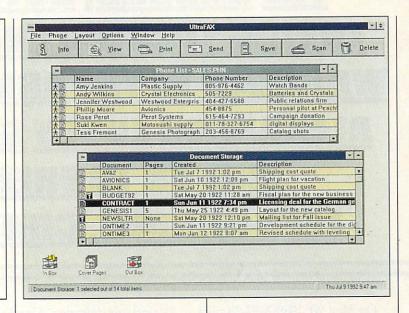
| COMPUTE'S<br>Fax<br>Software<br>Test<br>Lab | BitFax Easy | DataFAX 4.01 | Delrina WinFax<br>Pro 3.0 | Eclipse FAX<br>with OCR 1.21 | FaxMaster | FaxWorks Pro 3.0 | Intel FAXability<br>Plus/OCR | QuickLink Gold 1.1 | RapidFAX<br>Gold 2.10 | UltraFax 1.1 |
|---|-------------|--------------|---------------------------|------------------------------|-----------|------------------|------------------------------|--------------------|-----------------------|--------------|
| Background receiving                        | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| Background sending                          | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| Receive directly to printer                 | 0           | •            | •                         | •                            | •         | •                | 0                            | •                  | •                     | •            |
| Class 1 compatible                          | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| Class 2 compatible                          | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| Driver for application printing to fax      | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| Custom cover pages                          | 0           | •            | •                         | •                            | 0         | 0                | •                            | •                  | •                     | •            |
| Scheduling delayed fax transmissions        | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| OCR   | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| Scanner support                             | 0           | •            | •                         | •                            | •         | •                | •                            | 0                  | •                     | •            |
| Built-in phone list                         | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| Import/export phone list                    | 0           | •            | •                         | •                            | 0         | •/0              | 0                            | 0                  | 0                     | •            |
| Automatic fax cleanup                       | 0           | 0            | •                         | 0                            | 0         | 0                | 0                            | 0                  | 0                     |              |
| Change window colors                        | 0           | 0            | 0                         | 0                            | 0         | 0                | 0                            | •                  | 0                     | •            |
| Fax viewer                                  | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| Automatic reception                         | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| Manual reception                            | •           | •            | •                         | •                            | •         | •                | •                            | •                  | •                     | •            |
| Transmission of attached files              | •           | 0            | •                         | 0                            | •         | 0                | 0                            | 0                  | •                     | •            |
| Graphical fax-editing tools                 | 0           | •            | •                         | •                            | 0         | 0                | 0                            | 0                  | 0                     | •            |
| •= yes O= no                                |             |              |                           |                              |           |                  |                              |                    |                       |              |

# SPEAK UP!

Is there a group of hard-ware or software products you'd like to see covered in an upcoming Test Lab?
Let us know by calling (900) 884-8681,
extension 7010102
(sponsored by Pure Entertainment,
P.O. Box 186, Hollywood,
California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone.

pletely rearranged desktop. After I figured out what had happened, it wasn't much of a problem. But during background operations, you'll have to watch out so that inadvertent clicks and keypresses don't do something you hadn't intended.

As you probably know, Windows applications all compete for

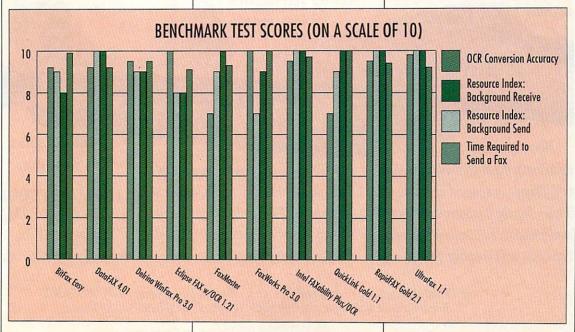


processor time. For this reason, I had to be careful while using other applications during background sends to avoid stealing too much processor time. On rare occasions, the remote fax machine interpreted a delay as a transmission error and hung up. The problem was worst when I had so many applications loaded that Win-

dows did a lot of swapping to disk. Except for those rare occasions, though, UltraFax sent and received without a hitch.

Overall, this is a fine piece of software. A well thought-out interface makes this capable program easy to use and worthy of your consideration.

Circle Reader Service Number 380



# .95 MACH, NINETY FEET ABOVE THE GROUND, BOTH SIDES TRYING TO SHOOT HIM DOWN. WOUNDED IN THE ARM, KAPITAN ALEXANDER ZUYEV GUIDED HIS MIG-29 TO FREEDOM LEFT-HANDED. COULD YOU?

On May 20, 1989 MiG-29 pilot

Alexander Zuyev began a desperate plan to steal the Soviet The pilot who wrote the book on the MiG-29, Alexander Zwyev, tells his harrowing story (including authentic Soviet dogfighting tactics in Fulcrum from Warner Books.

Union's most advanced combat aircraft and fly it to political asylum.

179-

Turkish air defenses to land safely on a civilian airfield in Turkey.

#### THE FINEST TECHNOLOGY RUBLES CAN BUY

The plane he flew is the MiG-29 Fulcrum, the crowning achievement of Soviet aeronautics.

Now, with

### NOTHING WAS LOST IN THE TRANSLATION

The flight model was patterned after actual Mikoyan-Gurevich (MiG) design specs.

So you can be every system control is ingly all

sure that and every painstakaccurate, the way

+315

Shot in a life

and death struggle with the sentry, Zuyev managed to take off. Then, flying dangerously low to avoid radar, he eluded pursuing fighters and deadly Soviet and MiG-29: Deadly Adversary of Falcon 3.0,™ Spectrum HoloByte's add-on to Falcon® 3.0, you can climb into the cockpit of the F-16's nemesis.

down to the Russian-accented cockpit warnings.

IT'LL TEST YOUR SKILL AND YOUR PATRIOTISM

Unlike the F-16, the MiG-29 isn't a fly-by-wire aircraft, so a

For Visa/MasterCard orders call 24 hours a day, 7 days a week: (800) 695-GAME. For technical questions call (510) 522-1164 (M-F: 9AM-5PM Pacific Time).

computer never limits your control inputs, whether inspired or foolish. Its twin Isotov RD-33 engines produce 36,600 lbs. of thrust, to the F-16's 25,000. And superb aerodynamics make it controllable at low speeds and high angles of attack that would have enemy pilots

The most fearsome opponent is a human one. With EBS, up to six players can go head-to-head.



fighting to avoid aspin.

#### THEY WON'T EVEN KNOW WHAT HIT THEM

Your MiG's IRST (Infrared Search and Track) system can track an F-16 without revealing your presence on his threat display. So you can get on his six o'clock before he even knows you're there. Once in range, you'll be able to lock on to the Falcon just by turning to look at him with the MiG-29's helmet mounted sight. Then call "pusk" (launch) as you fire missiles or "ogon" (firing) as you ventilate him with your computer-accurate 30mm gun. Either way, his plane will make a satisfying crunch when it hits the ground.



THE
ELECTRONIC
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THE ULTIMATE
CYBER-BATTLEFIELD

EBS is the first series of interconnecting simulations. Each title works with the others to bring you closer to the real thing. Now you can choose from multiple aircraft, multiple theaters, even which side of the conflict to fight on. And you can \*3)You abruptly

go head-to-head over a modem or with up to six e)You abruptly
pitch the nose
back to level
flight. Now
you're on his
six, with
a little
score to
settle.

players over a network. It all begins when you add on MiG-29 to Falcon 3.0.

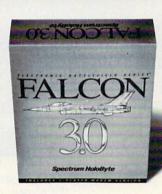
Anything more realistic wouldn't be a simulation.

#### INTRODUCING MiG-29



Choose your weapon.
The Falcon is lethal at
long distances. The
Fulcrum, deadly closein. Now you can fly for
either side.

VS.



MiG-29 add-on requires Falcon® 3.0. Available on IBM compatibles.

### Spectrum HoloByte









ELECTRONIC BATTLEFIELD SERIES®

The fight of your life.

Circle Reader Service Number 201

# **NEWS & NOTES**

Jill Champion Booth

#### VR for Kids

If you happen to be near a family amusement center sometime soon, look for an In-Video system and give your kids a chance to experience a touch of virtual reality. InVideo is the first peripheralfree VR system for the entertainment industry-and it's specifically for kids. Forgoing the standard helmet which creates a 3-D effect that immerses you in the environment, In-Video is more like a mirror world in 2-D, where the player's live video image is captured by a camera, transferred digitally, and projected

al reality as portraved in science-fiction movies and on TV, Friedman expects an In-Video upgrade once a year. A haunted-house version is in the works.

InVideo systems are also featured in numerous museums around the world, including the Brooklyn Children's Museum in Brooklyn, New York: the Franklin Institute in Philadelphia, Pennsylvania: the Laredo Children's Museum in Laredo, Texas; the North Carolina Museum of Life and Science in Durham. North Carolina: and the Eureka! Children's Museum in Halifax, England.

fairly basic compared to virtu-

Cool Sound

Speakers for your PC don't have to take up a lot of room and add miles of wire to your already-tangled cable web. The MM-1, part of IBM's new Plug 'n Run series of modules and monitors, is a slim, lowprofile sound unit that fits neatly under your monitor. Inside the compact case are two five-watt speakers that deliver sound to please even the most demanding ears.

The MM-1 works with all audio cards and features industry-standard RCA connectors. so there's no clutter, no desk space wasted, no mixed-up cable connections, and no compatibility confusion. Set the MM-1 under your monitor, plug it in, and enjoy.

Other features include a built-in microphone and input and output jacks for accessories (stereo headphones, auxiliary microphone, video, and

Controls for volume, tone. and balance are located on a pop-up panel in the front of the unit.

The 9.2-pound MM-1 supports monitors weighing up to 90 pounds. Suggested retail price is \$187.

Kids watch themselves interact real surroundings



into the game on a 120-inch TV screen. Choosing a game is as simple as pointing to and "pressing" the image of a button. Kids can opt to pop balloons while flying over treetops, tickle fish while swimming underwater, juggle planets and asteroids while soaring through outer space, or dodge raining cats and dogs. Every move a player makes interacts with the graphics onscreen.

InVideo creator Dean Friedman also designed the first virtual-reality TV show for Nickelodeon, "Eat-a-Bug," and has designed numerous games for the Nickelodeon kids' show "Nick Arcade."

And although this system is

**Setting the Tone** 

If the idea of buying a laser printer cartridge that's discounted 15 to 20 percent below discount-store prices and contains 20 percent more toner than standard cartridges appeals to you-and it shouldthen you'll also like the idea of getting back \$5 plus your shipping costs when you return your cartridges to the company for recycling.

Remanufactured is the keyword here, and Laser-Pro, an Illinois company, has developed a technique to remanufacture laser cartridges without toner leakage. The company can package the cartridges and ship them to customers nationwide.

Although recycling laser printer cartridges is nothing new, traditionally there have been problems with the toner leaking, confining remanufacturers to selling only locallywhere they can hand-deliver the product. According to Laser-Pro, although the cartridge-remanufacturing industry comprises some 3000 small companies, about 95 percent of the firms do business within a 25- to 30-mile radius of their home bases. Not so for Laser-Pro and its crosscountry business.

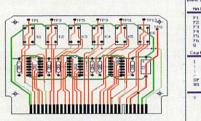
If you prefer to buy new, you can still buy new cartridges from Laser-Pro at 5 to 10 percent less than imported brands. But considering the environmental advantagesnot to mention the savingsof buying the remanufactured ones, why would you want to? For more information and pricing, contact Laser-Pro, 675 East Irving Park Road, Roselle, Illinois 60172; (800) 377-0551, (708) 893-2362 (fax).

**Big-Screen Game Playing** 

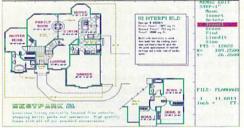
Guaranteed to turn your living room into a game room, Game Blaster from Advanced Digital Systems is a new PC-

WHAT DO THESE PEOPLE HAVE IN COMMON?

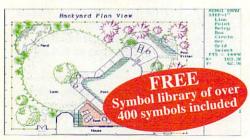




DRAFT & PRINT is an excellent choice for all but the most complicated projects. — PC Home Journal September 1992



"I just purchased your program. It does a great job. I'm doing a building remodeling and design plan, and it works well." —Nicholas Spagnola York, PA



DRAFT & PRINT... isn't limited to any particular category of projects.

—LA Times July 16, 1992



# DRAFT & PRINT

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#### SIMPLE TO INSTALL

Draft & Print was created so that you spend more time designing than figuring out where to begin. You can create, edit, and print scaled drawings of: floor plans, landscaping, elevations, woodworking, architecture, mechanical, electronic schematics, printed circuit boards and more. It even imports and exports to other graphic programs such as AutoCAD!

#### SIMPLE TO USE

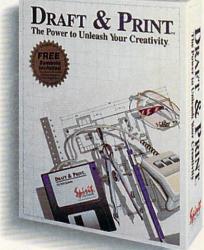
Completely voice-assisted. Draft & Print comes with 5 tutorials and onscreen help. It includes full scaling, editing, rotation, full color control, layering, area calculations and autodimensioning.

#### SIMPLY TERRIFIC

Draft & Print is the perfect design tool for CAD users at any level of expertise. Whether you're designing a landscaping plan, a new dream home or a TV entertainment center for your living room, you'll find Draft & Print is the ultimate design tool.

#### ☐ SIMPLY THE ONE TO BUY

Works on IBM and 100% compatible PC's. Supports CGA/EGA/VGA and Hercules monochrome monitors; laser printers, plotters and high res. output to dot matrix printers.



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A publishing partnership

#### **NEWS & NOTES**

to-video converter that allows you to play your favorite PC games on TV. Bundled with three popular game titles to get you started—Prince of Persia from Brøderbund and Jet Fighter II and Spectre Challenger from Velocity—Game Blaster is a great value at \$169 (the suggested price).

In addition to giving you the option of using your bigscreen TV for favorite PC games, it's great for those already using online services, such as America Online, Prodigy, or CompuServe. (COM-PUTE and Omni Magazine Online would look great on the TV.) Game Blaster is compat-

Sound for even the most discerning ears comes from the neat, compact MM-1, part of IBM's Plug 'n Run series of PC peripherals.



ible with all DOS applications, supports 640 × 480 VGA resolution in 256 colors, and outputs NTSC video in RCA composite and Super VHS supervideo standards. For more information, contact Advanced Digital Systems, 20204 State Road, Cerritos, California 90701; (800) 888-5244, (310) 809-6144 (fax).

#### Your World Series

Keith Hernandez, Ty Cobb, Willie Mays, and Shoeless Joe Jackson—all on the same team? What a lineup—and what a game that would have been—and can be with Baseball for Windows from Miller Associates. Using the most complete and accurate baseball statistics, Baseball

for Windows allows you to manage any team you want and see what could have been some remarkable moments in playing history.

Bringing the all-time greatest teams, fields, and plays to life, Baseball for Windows features a storehouse of play results, stunning reproductions of actual ballparks, an iconbased interface, easy-to-understand displays, built-in micromanagers, and special features-such as Advanced Injury Management (AIM), which provides more-realistic electronic playing conditions by tracking the status of players and determining if they're rested, tired, bushed, worn out, itchy, or benched.

The program's four modules (Baseball, League Manager, Advanced Draft, and Stat-Master) give you instant access to every aspect of baseball. Click on the picture of the guy stealing, and he'll go: click on a player's name, and his past and current game performance will be displayed. Special bench and bullpen reports provide key information so you can make informed playing decisions. For more information, contact Miller Associates, 11 Burtis Avenue, Suite 200, New Canaan, Connecticut 06840; (203) 972-0777, (203) 966-7547 (fax).

#### **Future Standards**

The framework of today's computing world encourages what has become quite a paradox: Developers are under constant pressure to add more features to their products; and as applications become more powerful, they also become more difficult to use, and consequently, less useful to people.

Apple Computer hopes to change all of that next year when it introduces a new computer architecture, called OpenDoc, that will integrate

software and enable sharing across multiple platforms and distributed networks. In fact, if all goes as planned, the desktop computer as we know it today will become obsolete.

What will this mean for you? Easy creation of multimedia documents, for one thing. You'll be able to place any kind of data into an OpenDoc document and edit it at will, without having to cut and paste between different application windows. You won't manually assemble the various pieces; instead, your OpenDoc document will hold all of them.

OpenDoc parts will behave much like current applications, enabling you to upgrade without having to go through a new learning process. Apple's stated intent is to make this technology not only cross-platform but also truly open—with both systems vendors and independent software vendors able to obtain the source code easily.

When the company introduces it in the second half of 1994, OpenDoc architecture will be available for the Apple Macintosh. WordPerfect and Novell plan to implement the architecture on the Microsoft Windows platform, and since it's designed to be highly portable, OpenDoc will probably become available on other desktop systems such as UNIX, according to Apple. IBM and Borland have also announced their support. Look for more on this in 1994.

Companies or public relations firms with items suitable for "News & Notes" should send information along with a color slide or transparency to News & Notes, Attention: Jill Champion Booth, COMPUTE, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

#### Take the Cache

Your answer to Fred Bell (May 1993) was wrong concerning cache memory. You said it cached information from the hard disk, but the cache associated with CPUs is processor cache, not disk cache. Processor cache is a bank of external high-speed memory-typically 15- to 20ns. This bank stores the most recent of the most often accessed areas of RAM, determined by a set of algorithms and the way the cache is designed. Additionally, every Intel 486 CPU has an 8K internal processor cache built into the chip. When a system is advertised with 8K of cache, it's this internal cache that's being referenced. It doesn't represent added value.

A processor cache makes a huge difference in CPU performance just as a disk cache makes a huge difference in disk performance. DOS-based 386 and 486 computers would see this performance increase with just 64K of external cache memory, while these same computers based on 32-bit operating systems such as OS/2 or Windows NT should have 256K of external processor cache to see the biggest performance boost.

You should also clarify to readers that 256K would be a rather small disk cache. My experience has shown that a disk cache between 1MB and 2MB provides the largest increase in disk performance. A cache larger than 2MB is more or less a waste of memory.

One more point: Some game programs that use expanded memory assume that you don't have a disk cache on your system and set up their own disk cache. Running two active disk caches at the same time can severely degrade the performance

of your entire system. In these cases, I recommend that you disable your system's disk cache and let the game program do the work. JOSEPH G. SAWAYA

Thank you for your correction, your clarification, and your

#### **Continuing Series**

SLIPPERY ROCK, PA

Could you please explain to me the difference between a parallel and serial port for printers and other devices? Is there an advantage in using a serial connector rather than a parallel connector?

RANDY BRAZEAU RIDGEVILLE, ON

A serial connector sends one bit at a time down a single wire. A parallel connector can send whole bytes at a time. The serial connector is more appropriately used in applications where the output will be traveling down a single pair of wires, such as a telephone wire, or where the receiving device handles your data very slowly, such as a printer.

Serial cables have more than one pair of wires, though, which allows a manufacturer to transmit important information quickly back and forth between the computer and the peripheral. That's why, when you're working with a Mac and a LaserWriter and the LaserWriter encounters a problem, the Mac can tell you the exact nature of the problem.

Until recently, parallel cables were one-way. They sent information relatively quickly, but when there was a problem at the other end of the cable, all your computer could tell you was that the output device was no longer accepting data. On the far end of the cable, the printer might be out of paper, jammed, or

on fire; your computer wouldn't have a clue. A new parallel cable specification changes all of that, granting intelligence to the connector. A collection of codes can keep the computer (and you) informed about the progress on the other end of the cable.

In summary, you'll find approximately equivalent printer performance with either a parallel or a serial printer because the printer is the bottleneck, not the interface. A serial printer has the slight advantage of offering two-way communication, but parallel printers will soon share that advantage. A parallel interface has the advantage of being by far the most common used by printers. And, finally, with serial mice and modems becoming more and more common, most people can't afford to sacrifice one of their two precious serial ports to a printer cable.

Choosing a cache, picking a printer port, acknowledging the Amiga, licking the lottery, and mailing to Maxtor

**Amiga Notes** 

I read with interest the special section on PCMCIA slots in the May 1993 issue (not available in all editions). Despite the depth of the article, there was not a single word about the fact that the Amiga 600, 1200, and 4000 all come equipped with standard PC-MCIA slots.

ERIC NIXON FOREST, ON

Just about every time we showcase a bit of new technology for the PC, we receive a handful of letters from Amiga owners with the general theme of "You talk about this new technology of (fill in the blank), but it's not new. It's been available for almost a decade on the Amiga." So, as a service to our readers, we will pause now to praise the Amiga. Virtually every advance that you read about for the PC was built into the Amiga: sound, animation, multitasking, and so forth. Commodore has a team of very forwardlooking engineers, and it builds one of the most capable desktop machines in the world. COMPUTE has long admired the Amiga (and the pioneer spirit of Amiga owners) and has prided itself on being the mainstream computer magazine that has paid the most attention to the Amiga over the years. If this sounds a bit like a eulogy, it is because, after several years of publishing first a quarterly magazine, then a bimonthly magazine, and later a monthly section of COMPUTE devoted to the Amiga, we have ceased our regular coverage of the machine as of October 1993.

The Lottery

I have written a small program to pick a group of six numbers ten times for the state lottery. The program doesn't seem to work.

LARRY RAY ALICE, TX

In the interest of scientific inquiry, we will overlook our moral objections to gambling. Sometimes it helps to state in specific terms what you want a program to do before you write it. You want to draw six random numbers from among the numbers 1-50. The six numbers all have to be different from one another. If you select a number once, it shouldn't be selected again in any group of six. And you want to generate ten of these groups of six. Although you could accomplish this in several different ways, the following program demonstrates what is probably the most efficient way. We'll create a collection of numbers (1-50), scramble them, draw the first six numbers, scramble them again, draw six more, and so forth. Here's the program. Remember that in order to get a winning number, you have to avoid thinking about an elephant when the program completes its operation.

DIM A(50) RANDOMIZE TIMER FOR I = 1 TO 50 A(1) = 1NEXT FOR J = 0 TO 9 **GOSUB SCRAMBLE** GOSUB DRAWSIX

NEXT PRINT "Don't think about an elephant." END

SCRAMBLE: SCRAMBLE = RND \* 1000 + 100 FOR I = 0 TO SCRAMBLE RESCRAMBLE: A = INT(RND \* 50) + 1: B =INT(RND \* 50) + 1: IF A = BTHEN GOTO RESCRAMBLE A1 = A(A): A(A) = A(B): A(B) = A1NEXT RETURN

DRAWSIX: FOR I = 1 TO 6 PRINT USING "## ": A(I): PRINT RETURN

#### To the Max

I have a question concerning my Maxtor 200MB IDE hard disk. Do you have the address for Maxtor?

DON SHAW LUSBY, MD

The address for Maxtor Colorado is 2190 Miller Drive, Longmont, Colorado 80501. Its telephone number is (303) 651-6000, or (800) 262-9867 outside of Colorado. Though it's a separate company, Maxtor supports Miniscribe drives. Incidentally, our source for many names and addresses is the 1993 Computer Marketplace, an unusually complete reference, published by Random House Electronic Publishing.

Do you have a question about hardware or software? Or have you discovered something that could help other PC users? If so, we want to hear from you. Call our special "Feedback" line: (900) 884-8681, extension 7010201 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. Or write to "Feedback" in care of this magazine. Readers whose letters or calls appear in "Feedback" will receive a free COMPUTE baseball cap while supplies last. We regret that we cannot provide personal replies to technical questions.

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# **INTRODOS**

Tony Roberts

# **DEFRAGMENTING YOUR HARD DISK**

One of the new utilities provided with Microsoft's DOS 6 is Defrag. This program helps keep your hard disk in order, resulting in faster file access and an improved success rate should you ever need to undelete a file.

Why is such a utility necessary? What causes the fragmentation that Defrag was created to cure?

The culprit is DOS itself and, more specifically, the way it stores your files.

When you first begin storing files on a newly formatted disk, DOS places the files one after another, starting on the disk's first track. It also keeps information about where each file is stored in the FAT (File Allocation Table). As long as you only add files, your disk will be neatly organized with contiguous files stored one after the other.

However, as soon as you delete or make changes to a file, you open the door to fragmentation. DOS stores files in units called clusters, the size of which depends on the size of your disk partition. Let's say you delete a two-cluster file from your disk. DOS updates the FAT to indicate that the two clusters once occupied by that file are now available for other use.

Since DOS stores data as close to the front of the disk as possible, the next time you save a file, DOS will store it in the space left by the deleted file

But what if the file you're storing is larger than two clusters? DOS fills the two-cluster vacancy with the beginning of the file and stores the remainder in the next available empty spaces on the disk. It keeps track of the various parts of a file through entries in the FAT.

When you open a file, DOS checks the FAT to get instructions on where to find all of the file's parts and then reassembles it for you.

DOS's ability to fragment files is a good thing. Otherwise, you could face a situation in which you had 10MB remaining on your hard disk but couldn't store a 2MB file because there were no contiguous spaces larger than 1MB.

On the downside, a badly fragmented hard disk degrades system performance by bogging down file access as the drive head travels all across the disk, rounding up the scattered clusters. File fragmentation also makes it more difficult to recover deleted files using DOS's Undelete command. Undelete normally can recover an unfragmented file in a snap, but if the file is fragmented, it has to do some guesswork to reassemble the file because the road map to the file that was stored in the FAT is no longer available.

Now that we've discussed fragmentation and discovered how it happens, let's look at what to do about it. If you have DOS 6, you can use the Defrag command. If you use an earlier version of DOS, you can get a defragmentation program either separately or as part of a disk utilities package. (In fact, the defragmentation program that comes with DOS 6 is a version of a program created by Symantec, which produces the Norton Utilities.) Defrag may not have all the bells and whistles of other software. but it gets the job done.

Defrag works on one of two levels. First, it can identify all of the fragmented files on your disk and move them to areas where they will fit contiguously. Or it can rearrange the files on your hard disk so that none is fragmented and all are packed together at the front of the disk. This latter option es-

sentially rewrites every file on your disk.

Today's defraggers have come a long way since the earliest versions, but because defragmenting involves your entire database, it's wise to take a few precautions: Have a current backup in case something goes wrong, run Chkdsk to make sure your disk has no lost clusters or file allocation errors, and disable any networks and multitasking software such as Windows or task switchers.

DOS 6's Defrag requires a lot of memory. If you receive Insufficient Memory messages, try to free up as much memory as possible by eliminating all TSRs. If memory remains a problem, borrow some memory from your graphics adapter using the following procedure: Add the parameters I=A000-BFFF and NOEMS to the CON-FIG.SYS command that loads EMM386, restart the computer, and then run the defragmentation program by typing defrag /g0.

After Defrag has finished its work, remove the parameters you added to the EMM386 line in CONFIG.SYS.

The A000-BFFF memory range is commonly used by video cards to display graphics screens. This procedure borrows that block of memory for use by the operating system. The /g0 switch used when starting Defrag instructs the program to run in text mode rather than graphics mode, avoiding a conflict over that block of memory.

Once you get the hang of using Defrag, you can automate the process by using DOS 6's multiple configuration feature to create a setup that runs Defrag. When you do this, you can use the /b switch on the Defrag command line to cause your system to reboot itself after Defrag has finished doing its work.

A badly fragmented hard disk degrades system performance by bogging down file access.

The

Before you sink a penny into MS-DOS\* 6, consider a better way to maximize the return on your PCs—the new PC DOS 6.1 from IBM.

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Introducing PC DOS 6.1

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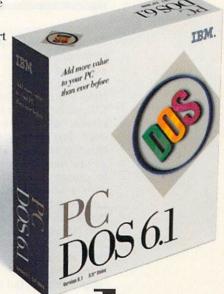
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| Approximate number of viruses that can be detected | >1,400     | 800           |  |  |
| Automated system configuration optimizer           | x          | A OTHER       |  |  |
| PCMCIA II support                                  | X          |               |  |  |
| Enhanced editor                                    | ×          | Military Baye |  |  |
| Program scheduler                                  | X          |               |  |  |



market.



# WINDOWS WORKSHOP

Clifton Karnes

#### **ROBOHELP 2.0**

Last issue, I talked about how to get the most from Windows Help from a user's point of view. This month, I'm going to talk about creating your own Help files.

Theoretically, the only tools you need to create a Windows Help file are the Help compiler (HC30.EXE or HC31.EXE) and a text editor that can produce ASCII text files, which the Help compiler reads and compiles. The Help compiler comes with most development systems, including the Win-

With RoboHELP 2.0, creating Windows Help files is a snap.



dows SDK, Visual C++, and Borland C++. You also get the Help compiler with most Helpauthoring tools.

Although you can create Help source files with an AS-CII text editor, the Help compiler's native format is RTF (Rich Text Format), which is a little frightening to work with in its raw form. It's much easier to create Help source files with a word processor that can export RTF. Word for Windows has excellent RTF support (Microsoft invented RTF), and it has become the standard for Help authors.

Information on creating Help is sparse, but one excellent source is the Microsoft Help Authoring Guide, a Help file itself that explains Help file creation. It's available on the Windows SDK forum on CompuServe and on the Microsoft Developers Network CD. I haven't mentioned the MSDN CD before, but it's an indispensable tool for all Windows developers and professionals. It's

a quarterly CD-ROM that boasts the entire hypertext documentation of the SDK, Visual C++, Petzold's Windows 3.1, and scores of other references. It also has lots of programs and useful information, including the Help Authoring Guide and other Help-authoring aids.

Back to creating Help. Using a word processor like Word for Windows instead of a text editor makes creating Help files easier, but it's still hard work. You have to put in the codes for topics, jumps, and graphics all by hand. And after you've saved your file, you have to compile it with the Help compiler, which, amazingly, is DOS based.

After you've gotten your feet wet with creating a few simple Help files, you'll begin to realize that this should be easier than it is.

Coming to the rescue is Blue Sky Software with Robo-HELP 2.0 (619-459-6365, \$495). This program is a superb tool that turns Word for Windows into a Windows-based integrated development environment for Help, much the way Visual C++ and Visual Basic are integrated development environments for programs.

Everything that has to do with Help file creation and maintenance is automated with RoboHELP. The program installs a floating toolbox in Word and adds several items to Word's menus. To build a topic, you simply click on the Topic button. The program prompts you for titles and keywords. Creating a jump is just as easy. You click on the Jump button, and RoboHELP asks you where you want to jump. Creating pop-ups is a snap, too.

RoboHELP also has excellent support for embedded graphics, so managing BMP and MRB files is easy. In fact, you can do just about everything you'll ever need to do

with a Help project from Robo-HELP without ever having to write a line of code. If you're familiar with creating Help files, you'll know all about the Help project file, which has an HPJ extension. With RoboHELP, you'll probably never have to edit this file by hand.

One area in which Robo-HELP really shines is Help macros. As you may know, the Help engine provides a set of macros that you can use yourself. (These macros should really be called functions. The macro name probably comes from the fact that Windows Help was developed by the Excel group.) These macros do things like print the current topic, set bookmarks, and the like. When you tell RoboHELP you want to embed a macro. it automatically supplies a list of all the available macros. You simply click on one, and RoboHELP puts the code in your Help document.

When it's time to compile, you just click on the Compile button. RoboHELP runs the DOS-based compiler engine in the background, gathers any error messages, and displays them in a window for you. You never have to see a DOS screen. In fact, unless you knew otherwise, you'd probably never guess that the Help compiler is a DOS program.

When you compile, if you find errors, RoboHELP will display the error messages and offer you a short explanation of what each error message means. If you've tried to decipher Help compiler error messages before, you know what a boon this is.

After you've successfully compiled your program, you can run it from Word by clicking on another button on Robo-HELP's toolbox. If you're getting the impression that this program is wonderful, you're right. Creating Help just doesn't get any easier.

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# **PROGRAMMING POWER**

Tom Campbell

# DI-OGIX: BETTER THAN I THOUGHT

One of the great pleasures of being a columnist is that I get to see software I'd otherwise miss. A perfect example is diogix from On Top Systems (P.O. Box 676, Northbrook, IIlinois 60065-0676; (708) 291-0214). It's billed as application development software with a spreadsheet, support for multiple printers, Btree database manager with support for dBASE and ASCII files, portability to UNIX systems, and an advanced report writer. It's a character-based environment without mouse support, and it looks and feels like a spreadsheet all the way through. With its \$99.95 price for a single-user DOS version up through \$249.95 per UNIX user, I figured that each person who used di-ogix applications (as opposed to the developer, who wrote them) had to buy a copy. If programmers had to sell all the applications they developed using di-ogix with what was effectively a \$100.00 runtime charge per copy, it seemed overpriced despite the low single-user cost. I didn't notice this clear statement on the brochure: "Applications may be distributed with di-ogix runtime royaltyfree."

This is an interesting product because in 1993, it will probably appear to pundits as a good five years behind the times. Without Windows support or its own GUI or graphical print preview or requirement of 75 megabytes of disk space (would you settle for 2 megs plus change?), di-ogix would seem to be a product out of a distant era. Yet its usefulness was immediately clear to me. The phenomenal appeal of spreadsheets has produced a vast army of people who are programmers but

who don't think of themselves that way. Spreadsheets aren't terribly difficult to learn. Typically, they're in a matrix layout, with columns given the names of successive letters across the top (the first column is A. the second is B, and so on). Rows are given numbers starting with 1. Spreadsheets think most naturally in numbers, so to enter a number, you just move the highlight (a cursor that normally fills one cell at a time) and start typing. To apply a subroutine called an @function (pronounced "at function") to those cells, you use the name of the formula, which normally starts with an @ sign. For example, to add up all the numbers in the first three cells of the first column (A1, A2, and A3), you'd type in, say, cell A4 the @function @SUM(A1..A3). You can combine normal math operators such as + and - and @functions into formulas. You can enter text in cells and use formulas that act on text. There are built-in @functions for just about everything, and the spreadsheet also lets you display numbers using different formatting. Dates, for example, are normally stored as numbers but are formatted for display via a date formula as dates.

Last but not least, spreadsheets have a seductive immediacy about them. Because they show the results of formulas instantly, they allow you a lot more experimental latitude than pencil and paper, promoting insane bouts of fiddling with mortgage payments, project schedules, and even small database applications.

While the @function approach isn't elegant, millions of people know it by now. Once you've learned spreadsheet basics, there's little else to trip you up. This product capitalizes on spreadsheet strengths and goes the spread-

sheet one further by giving the user all the tools necessary to create stand-alone applications for anything from a protected-mode 386 to an 8088 dinosaur. There are @functions for advanced data entry (long a spreadsheet bugaboo), menus, relational database work far beyond what spreadsheet users are accustomed to, file and disk access-everything a developer needs. (Almost. The debugger costs extra, but you can get by without it if you're underbudgeted.) Even if you don't know spreadsheets or if you've found BA-SIC or C too hard, you'll find diogix capable of producing significant works with only a few weeks of study. If you know spreadsheets, that time estimate will drop to a few days. This program has the best tutorials I've ever seen on a commercially released product; they make up an entire training manual and provide step-by-step examples of all its major features. If you find learning software difficult because manuals take too much for granted, the di-ogix training manual will be a revelation. The reference isn't quite as close to the mark. It's underindexed and lacking in some information (such as details on file formats, which the tech people happily provided), and it's sprinkled with gaseous "inspirational" epigrams that did nothing to improve my reading experience. Ironically, the sample applications are OK but not nearly up to the product's potential.

This product is up to just about any small business, charitable organization, or club task, and you can give away or sell your programs with a free runtime version that's included in the price. If you've found traditional programming languages too complex or slow, take a long, hard look at diogix before you give up.

Spreadsheets have a seductive immediacy about them because they show results instantly.

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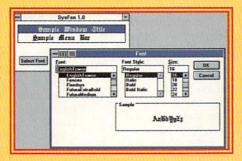


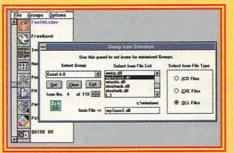
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# TIPS & TOOLS

Edited by Richard C. Leinecker

#### Windows One-Liners

Windows is great for doing almost everything. But there are plenty of times I know a DOS shortcut that could save some steps. Or often, I just feel more comfortable doing something from DOS. But using these options usually means running the DOS prompt, doing what I need to do, and then typing exit to return to Windows.

I've devised an easier way. I use QBASIC to perform the DOS function and use the nice features Windows has to

make it easy to call.

Start by running QBASIC, typing in the program I've written called DODOS.BAS, and saving it. Just for your own reference, I saved it to my C:\DOS directory. You don't have to do exactly this, but in my instructions later, I explicitly name this as the place where I saved it. If you save it to a different directory, make the substitution when following the directions to set up the Windows icon.

PRINT "Enter your one-line DOS command (or Enter to abort)" INPUT A\$ IF A\$ = "" GOTO OUTOFHERE SHELL A\$ PRINT "Press any key to return to Windows . . .'

**GETKEY:** A\$ = INKEY\$ IF AS = "" GOTO GETKEY **OUTOFHERE:** SYSTEM

With the BASIC program saved, go to Windows. Pick the window in which you want the DOS command icon to appear. I used the Accessories window. Click in this window, and go to the Program Manager's File menu and select New. Make sure the Program Item button is selected when the dialog appears. Click on the OK button.

For my description I typed in Single DOS Command. For my command line I typed in gbasic /run c:\dos\dodos.bas. For my working directory I typed in c:\dos. It's important to note here that the BASIC code and the QBASIC program are both in my C:\DOS directory. If either is different, change the command line entry accordingly.

The last thing I did was to make the BASIC program easy to use by entering in a shortcut key. I pressed Shift-Ctrl-D. Anytime I want to run a single-line DOS command, all I do is press Shift-Ctrl-D, and it runs the BASIC program.

When the program runs, it tells me to type in the line I want to execute (or I can press Enter to skip it). The command is executed, and then I press a key to return to Windows. It's all much easier than using the DOS prompt. ELMER W. ALLISON

**Graphic Boxes** 

WordPerfect 5.1's cross-references feature (Alt-F5, 1) gives you a great way to cite page numbers of specific points in a long document. You do have to be careful where you put a cross reference. You cannot, for example, put a cross reference in the text area of a graphic box. But you can reference graphic boxes by placing a page-number Target reference (Alt-F5, 1, 2) in the graphic box caption.

If page space forces the graphic box to bump to a following page, the page-number reference will still be generated correctly.

WILLIAM WOLFE CHAMPAIGN, IL

More Typewriting

In the June 1993 issue you have a tip that makes your keyboard into a typewriter. It works pretty well, but there's another way that works well,

At the DOS prompt type copy con prn and press Enter. From that point on, what you type will be sent to the printer. Once you're done, press F6 and Enter.

EDGAR F. GARWOOD HUDSON FL

#### Path Additions

Sometimes I want to add a directory to my path for a short while. I used to simply retype my path statement with the addition. After doing that far too many times, I discovered a better way in the form of two batch files. The first one. called ADDPATH.BAT, adds a single directory to your path statement. The second one, called RESTPATH.BAT. restores the path to whatever it was before you ran ADD-PATH.BAT the last time.

This only works correctly if you add and restore in pairs. Make sure your path in AU-TOEXEC ends with a semicolon. Any semicolon you type when adding to your path will be ignored. Here is the listing for ADDPATH.BAT.

@ECHO OFF SET OLDPATH=%PATH% SET PATH=%1%PATH%

Here is the listing for REST-PATH.BAT.

@ECHO OFF SET PATH=%OLDPATH%

THOMAS E. HINES III KANSAS CITY, MO

Personal Backups

Running complete backups is very time-consuming. I've written a batch file called QBACK.BAT to back up only my personal data files. It's quick, and the backups fit on a single high-density floppy

Running a one-line **BASIC** program from Windows and using your keyboard as a typewriter

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disk. Modify it to suit your own needs.

@ECHO OFF ECHO Place backup disk ECHO in drive A. PAUSE PKZIP -BC -U A:\ROOT C:\\*.\* PKZIP -BC -U A:\WININI C:\WINDOWS\\*.INI PKZIP -BC -U A:\WORKS C:\MSWORKS\\*.W?? PKZIP -BC -U A:\GRAFFIX C:\GRAPHICS\\*.c??

You must have the program PKZIP located somewhere in your path. The -U switch processes only new or modified files. The -BC switch makes PKZIP use drive C for its temporary files so that the entire space of the floppy can be used

The result is a floppy with ZIP files containing the files I need to save. They're only the latest versions of the files on my hard drive.

ALEX FREIBERG SOUTH YARRA, AUSTRALIA

#### **Finding Your Roots**

Here is a little tip that I have found useful. Some programs that I run either change directories or need them changed before running. I wanted a good way to return to the same directory I started from.

I have seen several tips in the past that suggested saving the directory using the CD command and then using Debug to shorten the outputs, thus creating a batch file containing one line that had the current drive and one line that had the current directory with CD \ before it.

So with that idea in mind. I wrote SAVEDIR.

#### debug savedir.com File not found

-e 100 b4 19 cd 21 00 06 30 01 -e 108 b4 47 b2 00 be 38 01 cd -e 110 21 bb 38 01 43 80 3f 00 -e 118 7f fa c6 07 0d 43 c6 07 -e 120 0a 43 c6 07 24 b4 09 ba -e 128 30 01 cd 21 b4 4c cd 21 -e 130 41 3a 0d 0a 43 44 20 5c CX 0000

:38

Writing 0038 bytes

When you run Checksum on I

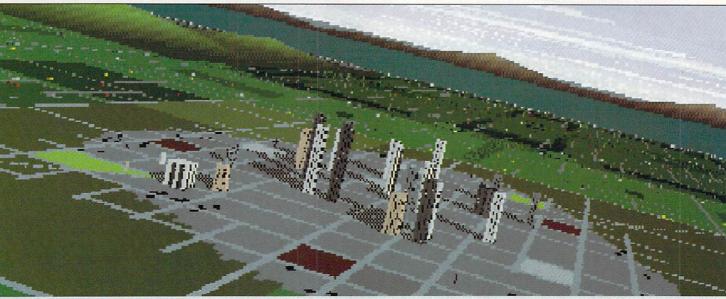
this program, you should see the number 04660 on your screen. (The latest Checksum program can be found in the July 1993 "Tips & Tools.")

Here is a sample batch file that might use it.

@ECHO OFF SAVEDIR > C:\BAT\RESTDIR.BAT

CD \WP51\DOCS\AR\MAR93 WP REPORT.WP RESTDIR

When I exit WordPerfect, I am returned to the directory that I started in on the drive that I started from. The batch file above assumes that I have a directory named BAT that is in my





path. It creates a batch file with DOS redirection that later it invokes to return to that exact place.

BRADLEY M. SMALL GREENSBORO, NC

#### **One-Line Time**

I get tired of having my computer stop for a new time entry each time I type time at the command line. Usually, I don't want to set the time. I just want to know what time it is.

Here's a QBASIC program I use in place of my Time command. It's called TIME.BAS.

#### PRINT TIME\$ SYSTEM

Then I created a batch file

called T.BAT, which I placed in my DOS directory.

#### QBASIC /RUN TIME.BAS

Whenever I want the time, I just type t and press Enter.

Since QBASIC also has a DATE\$ function, you can easily adapt this tip to print the date without DOS pausing for input afterward.

ROBERT BIXBY GREENSBORO, NC

#### **Even Less Time**

Not satisfied with the previous tip, which causes the QBASIC screen to flash before the time is displayed, I came up with the following set of batch files that display the time and date without going through BASIC.

The first set is for MS-DOS, and the second set works with 4DOS.

Here is TDOS.BAT, which displays the time if you are using MS-DOS.

@SET OP=%PROMPT%

@SET PROMPT=\$T\$\_

@SET PROMPT=%OP%

Here is DDOS.BAT, which displays the date in MS-DOS.

@SET OP=%PROMPT% @SET PROMPT=\$D\$\_ @SET PROMPT=%OP%

Here is T4DOS.BAT, which displays the time in 4DOS.

@echo % time

And finally, the following pro-

gram is D4DOS.BAT, which can be used to display the date in 4DOS.

@echo % date

BRADLEY M. SMALL GREENSBORO, NC

If you have an interesting tip that you think would help other PC users, send it along with your name, address, and Social Security number to COMPUTE's Tips & Tools, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. For each tip we publish, we'll pay you \$25–\$50. All tips submitted become the property of General Media International.





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# HARDWARE CLINIC

Mark Minasi

#### **CMOS FAILURE**

I got a letter from a reader in Sioux City, a fellow named Chuck Rearden. Chuck had a common problem: Something had blown away his system's setup information, and he didn't know where to get the information to restore it.

The best solution to this sort of problem, as it turns out, is fairly simple (but not obvious), so I thought I'd share it with you.

"I did something dumb, and now I'm paying for it," Chuck told me in his letter. "In the cold of our dry South Dakota winter, I walked into my office and touched the case of my PC. I felt the shock of a static zap jump from my finger to the PC's case, and when I turned my PC on, my worst fears were confirmed.

"I got a message saying CMOS memory checksum failure, press F1 to continue. I didn't know what that meant. but it didn't look good. So I pressed F1, but then all I got was a message saying disk boot failure.'

By the time I got Chuck on the phone, it was three weeks after the date of his letter. He'd progressed a bit. In three weeks. Chuck had learned what a CMOS memory checksum failure is.

"I've found out that I've got to fix the CMOS information with a program called Setup. which is built into my computer," he explained. "I can only get into it when booting the system; if I press the Delete key. the Setup program appears.

"It needs to know a bunch of information about the computer, but most of it's pretty simple. It wants to know the date and time, and that I can handle, and even filling in the type of floppy drives isn't too hard—the dealer helped me out with that I didn't touch the display type, as it said VGA/

PGA/EGA. I left it untouched. even though I've got Super VGA, because there wasn't an option for Super VGA, and the dealer told me to leave it as is.

"What stumps me, and the dealer too, is the drive type. Setup needs to know the number of cylinders, sectors, and heads, and the write precompensation—whatever that is for the hard drive. I don't know the information, and the dealer. . .doesn't, either. So we're stuck until I can find out how the drive's laid out."

One of the more annoving events in any PC support person's life (or any PC owner's life) is dealing with a four- or five-year-old computer that's lost its setup information (also known as its CMOS data). The CMOS includes data that is, in general, easy to retrievewhat kinds of floppy drives you've got and how much memory is in the system.

But losing the CMOS does cause one major problem: You lose the drive type information. Setting up the CMOS again for a hard drive requires that you know four things about a drive: how many read/ write heads in the drive, how many cylinders on the drive, how many sectors on each hard disk track, and which cylinder to start doing write precompensation on (don't worry about write precomp).

Sometimes you'll lose your setup information by overwriting it or by some electrical or mechanical mishap, but most commonly the CMOS is lost because the battery that maintains the CMOS information runs out of power-usually about three to five years after you've purchased the computer. If the CMOS's battery loses power, then the CMOS forgets what it knows about your system. When you power it up, the computer detects that the CMOS's battery is dead and says, in effect, "I have no idea what kind of equipment is in me-what kind of floppies, display, hard drive, or even the date or time. If you press F1, then I'll take the best guess that I can." Unfortunately, its best guess about hard drive type is that there's no hard drive at all. Since the system thinks that there's no hard drive present, it only tries to boot from the floppy. The floppy drive, however, probably doesn't contain a bootable floppy, so the boot-failure message appears.

Many people find that when the battery gets low, the date and time are fine, but the other CMOS information is gone. That's fairly common. The clock is maintained by a simple clock circuit, but the other information is maintained by a memory circuit. Memory circuits draw more power than clock circuits, so it's quite reasonable for the clock to continue to keep fairly accurate time despite the loss of the CMOS memory.

Anyway, back to solving the problem. As the computer is about four or five years old (which is, again, the life expectancy of the average CMOS battery), you've probably mislaid the documentation (if you ever got it in the first place) about the hard disk. How are you to find out the disk's aeometry? (For geometry, read the number of heads, cylinders, and sectors.)

One surefire approach is to take the cover off the computer, remove the hard disk, and look for a model and serial number, like XTOR-TECH model E425523-SW. You'd then find the number for the hard disk maker, call, and ask what the geometry of the hard disk is. There are, however, two problems with this method. The first problem is that it's a pain in the neck to have to remove the drive, find a phone number for the vendor, and try to

How can you find out vour hard drive type when you lose your setup? Use **Norton's Diskedit to** find that hardto-trace information. Upon purchase of a

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Dog McCree is a trademark and licensed product of American Laser Games, © 1990 and © 1993. STAR WARS® REBEL ASSAULT is a trademark of LucasArts Entertainment Company. STAR WARS is a registered trademark of Lucasfilm, Ltd. Used under authorization. © 1993 SEGA, 3335 Arden Road, Hayward, CA 94545. All rights reserved. Sega CD unit made in Japan. Software made in the U.S.A. get through to the tech support department. The second problem is that many manufacturers have gone out of business in the past five years, so you may not find anyone to talk to anyway.

Fortunately, there is a better way. The vital statistics for most disks are sitting right on the disks themselves.

Every hard disk that's ever been used in a PC has been partitioned, a process usually performed by the Fdisk program. Partitioning was originally created to allow multiple operating systems to coexist on a single hard disk, but you (or the person who sets up your computer) must partition the disk even if that means allocating the whole disk to just one partition. The information that describes how a disk is partitioned is stored in an area called the partition table. which is part of the master boot record, or MBR, which is on every PC disk.

Partition information describes each partition by including both its starting address—which cylinder, head, and sector it starts on—and also its ending address—which cylinder, head, and sector it ends on. Assuming that whoever set up the disk used all of it, the coordinates of the last cylinder, head, and sector on the partition should also be the coordinates of the last cylinder, head, and sector on the disk.

The MBR is always located at cylinder 0, head 0, sector 1. Cylinder 0/0/1 is readable from drive type 1 (a 10MB drive description), and drive type 1 will make any hard disk's MBR readable. It won't make it bootable, but it'll make it readable. So you can boot from a floppy and use a disk utility to read 0/0/1.

Putting this all together, you can find out the vital statistics on any mystery disk by following these steps.

Step 1: Create a bootable floppy disk, and put the Norton program DISKEDIT.EXE on it. It's part of the Norton Utilities (and has been since version 2.0). My explicit instructions will be for version 7.0.

Step 2: Boot from the floppy containing Diskedit.

Step 3: Run your PC's Setup program. Under hard disk drive type number, you'll see that it probably says drive type 0 or no hard disk. Change it to drive type number 1.

Step 4: Run Diskedit by typing diskedit c: at the command line. If you see a message box warning you that Diskedit is in read-only mode and that no changes that you make to the disk with Diskedit will be actually written, that's fine because you don't want to accidentally make things worse by overwriting information on your hard disk. Just press Enter to clear the message box.

Step 5: Diskedit may complain about your hard disk not making sense; that's to be expected, so just tell Diskedit to ignore any problems. Don't let Diskedit make any changes to your system.

Step 6: You'll see a menu across the top of the screen with these options: Object, Edit, Link, View, Info, Tools, and Help. You pull down a menu by pressing the Alt key and the first letter of the menu option, so press Alt-O to pull down the Object menu. The Object menu starts off with the options Drive and Directory. Look for an option that says Partition Table Alt+A. If this option is grayed out, you'll have to choose the Drive menu selection. (If Partition Table Alt+A isn't grayed out, just skip to the next step.)

You'll see a dialog box asking which drive to edit and whether the drive is a logical or physical disk. Select the radio button for Physical disks,

and select Hard Disk 1.

Step 7: Now tell Diskedit to get the MBR and show you the partition table inside it. Just press Alt-A to tell Diskedit to load the MBR into memory. and then press F6 to tell Diskedit to show you the partition table within the MBR. You'll probably see one or two partitions; look at the partition whose ending location contains the larger numbers. For example, the disk that I'm looking at reports an ending location of side 15, cylinder 993, sector 63 (what Setup calls heads, Diskedit calls sides). Write down the side, cylinder, and sector numbers.

Step 8: Exit Diskedit (press Esc and then confirm that you want to exit the program).

Step 9: Assuming that whoever originally partitioned this disk used up all the cylinders, that would mean that the last sector on my particular disk was the sector at cylinder 993. head 15, sector 63. That implies that there were 994 cylinders on this disk, because the first cylinder's number is 0, not 1. It also implies that the number of heads is 16, because the first head's number is also 0. For some reason, sectors are numbered starting with 1, not 0 (don't ask me why; I have no idea), so if the last sector is 63, the number of sectors is also 63. So add 1 to the cylinders and sides to get total numbers of cylinders and heads, and don't do anything to the sectors to get total numbers of sectors.

Armed with this knowledge, you can then match these values to your system's drive table to find out which drive type the disk is. On more modern systems, you wouldn't find a drive type; instead, you'd pick drive type 47, the user-definable type, and directly punch in 994 for the cylinders, 16 for the heads, and 63 for the sectors.

The information that describes how a disk is partitioned is stored in an area called the partition table, which is part of the master boot record.

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## Infinite Expansion Open up nearly any PC. Chances are, the innards would bring a devilish smile to Dr. Victor Frankenstein's lips. Sound card here, fax/data modem there, SCSI controller over there. Dig through the jumble of ribbon cables, and what do you see? A cuttingedge, 24-bit graphics card chugging away on a slow, 8-MHz, 16-bit bus. Of all of humankind's great creations, the PC must rank among the most haphazard. Take a poll of your friends. I'd bet that no two of them have even remotely the same setup. With the exception of the disks that we insert in the front and the power cord that we plug into the wall, our computers are as individual as we are. They're machines, yet they're an amalgam of parts and pieces reminiscent of the late-night works of Dr. Frankenstein. Like the good doctor, we must experiment and tweak to Article By Paul C. Schuytema



it doesn't like being compressed, and your beast will turn against you.

How do the parts work together? How does your video card get information from

your hard disk? How does your fax/data modem know what to send?

The answer is connectability. Parts connected to more parts, sharing information across standardized pathways called buses. Bus is a shortened version of omnibus connector, a term utilized in the Precambrian Era of personal computing, when con-

**Illustration By Kee Hwa Jeun** 

nectability first became an issue and standardization had only begun to be a concern.

### S-100

The first bus standard was known as the S-100, short for Standard 100 (so designated because it was the de facto standard and was based on a clip that had 100 pins). Back in 1975, when Popular Electronics and MITS (originally a model-rocketry company) decided that it would be a good idea to produce a kit for building a computer, they came up with the Altair 8800, a rather ignoble beast which sold beyond anyone's wildest expectations. Yet this primordial PC was nothing more than a glorified box, an energy leach which communicated through front-panel switches and lights.

To work, it needed connections. The designers thought that making these connections modular—in a bus—would be more efficient than having the connectors on the computer board itself. A bus would also allow third-party manufacturers to produce enhancements for the Altair that the user could simply plug in. So the S-100 bus was born.

Not much planning went into the S-100. In fact, it featured 100 pins simply because MITS happened to get a good deal on a surplus of 100-pin connector clips. Now, planning and forethought dominate the world of PC buses. Committees and manufacturing groups are constantly working on creating new bus standards. Yet, what, really, is a bus? In the simplest terms, a bus is a physical channel (wires, pins, or circuit board paths) between the CPU (Central Processing Unit) and the other components of a computer, such as a disk drive controller or video board.

### The ISA Bus

While the S-100 remained the de facto standard for a number of years, and the IEEE (Institute of Electrical and Electronics Engineers) attempted to improve and refine it in 1983, the S-100 had the unfortunate luck to exist in the calm before the revolution. Not until IBM released the PC did the personal computer industry take off. The old PC (and the XT that followed) featured 62line expansion slots which provided an 8-bit, 4-MHz data path to the CPU. This bus is commonly known as the 8-bit ISA (Industry Standard Architecture; pronounced "eye-sah") bus. It wasn't long before IBM upped the ante and introduced the 286-powered AT.

The 286 was a 16-bit CPU, and so the engineers at IBM developed a 16bit expansion bus. Yet they didn't want to leave the PC users, or that established base of expansion boards, in the dust. So the new bus was an extension rather than a reworking of the old bus. An additional connector was added in line with the old connectors, so a user could plug in an XT board, or a newer AT board. The 16-bit ISA bus was born.

This bus was the data highway between the CPU and the peripheral components, and it provided a 16-bitwide path that operated at 8 MHz. In the early days of the AT and clones, a speed of 8 MHz wasn't such a bad deal, since it was the speed of most processors. It's difficult to remember in this day and age that the 286 CPU of the original AT-for Advanced Technology-was an 8-MHz chip. Later, as CPUs gained speed, some manufacturers attempted to match the bus speed with the CPU, with unpredictable, even dangerous, results. Eventually, 8 MHz became the standard speed for the ISA bus. This speed is not much of a disadvantage for such things as modem boards. which operate at slow speeds anyway. Instead, the limitation is felt when a memory, video, or SCSI board. which has the potential to keep up with the processor, must be reined down to 8 MHz.

### **Darwinian Revolution**

Currently, the ISA bus is the industry standard, based on sheer numbers

alone. Yet this bus's limitations proved to be a turning point in the evolution of the PC.

Most 486 PCs still communicate with their components through an ISA bus. As a result, most boards will work on most computers, offering a myriad of choices for the user. Yet this standard forces a 50-MHz, or even 66-MHz, 486 to communicate with its expansion cards at 8 MHz. If Dr. Frankenstein were to look over our creation, he'd be shocked to see the equivalent of his giant's cardiopulmonary system fitted with the smallest of capillaries and nothing else.

The ISA bus is far from being ready for the charnel house, however, Recently, Microsoft and Intel announced a plug-and-play modification for the ISA bus specification. While not changing the speed of the bus. this enhancement will mean easier installation of components. When it comes time to install a new board, you won't have to fiddle with DIP switches, trying to find that combination of addresses that makes the card work in concert with other peripheral devices. Instead, you'll plug in a board and let software set it up. This type of autosensing is a key element of the more advanced expansion buses and has been employed for several years in the NuBus on Apple's Macintosh computers. These new plug-and-play boards should start popping up near the end of 1993.

### Glossary

**bus.** Most basically, a physical pathway between the various hardware devices that make up a computer. A computer can have several buses, such as the CPU's data bus, a memory bus, a local bus, and an expansion bus.

**bus master.** An expansion device which temporarily takes charge of the bus, controlling data transfers in and out of memory without help from the CPU.

data throughput. The actual amount of real information that is either transmitted through a bus or processed by a device. Not all information that leaves a bus necessarily counts as real information; some information might be redundant or be part of some error-checking system.

intermediate bus. A bus connected to the CPU's data bus through a buffering controller which is responsible for the speed and timing of the data operations. The PCI bus is an example of an intermediate bus.

local bus. A hard-wired expansion bus between a connector and the CPU data lines. A local bus allows a device, such as a video controller, to operate at the same speed as the CPU.

megahertz (MHz). A unit of frequency representing one million cycles per second, often used to describe a computer's clock rate or its raw, internal speed.

**plug-and-play card.** An expansion card that configures itself, either with an installation program or during boot-up.

**SCSI.** Small Computer System Interface. SCSI could be considered another bus standard, but one that requires a controller to fit into a computer's standard bus socket. A SCSI interface is often used to control hard drives or CD-ROM drives.

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### The MCA Bus

IBM took notice of ISA's shortcomings. When the first of the 32-bit Intel CPUs—the 386—appeared, IBM incorporated a new 32-bit bus architecture into its PS/2 line of computers: the MCA (Micro Channel Architecture) bus.

The MCA bus is software-compatible with the ISA bus, but that's where the similarities end. IBM attempted to make a bus that would grow with the advances in hardware, featuring a tight bundle of specifications and the ability to perform bus mastering (an operation in which a component actually supersedes the CPU and has free rein of the bus for a time, greatly speeding up operations). The MCA bus also allows components to enjoy direct memory access instead of putting in requests for memory access via the CPU.

Yet for all its technological advancement, the MCA bus is already on its way out, atrophying in the highspeed world of computer advancements. The MCA bus is not physically compatible with any other bus; a board must be specifically designed for use with the bus. The MCA design specs are the property of IBM, which is not providing board manufacturers with easy access to the information. Basically, any third-party vendors who wish to manufacture MCA boards must re-create the bus themselves. spending precious R & D dollars, and then pay IBM a percentage of the gross sales of the board for the privilege of using the bus. As anyone who watches the PC market can tell you. that procedure is unlikely to gain the MCA bus any champions.

### **EISA Bus**

The MCA bus was developed by IBM to speed up expansion bus operation and to bind developers to Big Blue (as IBM is known in the industry). But it caused resentment among other computer makers who objected to its nonstandard design and were rankled by the notion of paying IBM a premium. As a reaction to the MCA bus, a group of makers of PC clones and compatibles got together and developed a competing standard, one which was both hardware- and software-compatible with the ISA bus. They dubbed the new standard the EISA (Extended Industry Standard Architecture) bus.

Physically, an EISA (pronounced "ee-sah") expansion slot looks the same as an ISA slot, except that it's deeper. An ISA card will fit into the slot, connecting with one set of pins, while an EISA card will fit further into the slot, connecting with the EISA

### When Is a Bus Not a Bus?

Two other interesting bus alternatives deserve mention. One is the SCSI (Small Computer System Interface) which allows up to seven peripherals to be daisy-chained (linked device-to-device)—in theory, though most SCSI devices for PCs have a somewhat proprietary standard that prevents daisy-chaining, requiring that you use a dedicated ISA card for each SCSI device. Emerging solutions like CorelSCSI and SCSIWorks make it possible to daisychain even these recalcitrant SCSI devices, however.

The parallel interface is emerging as a sort of bus. The mother of this invention was the necessity to link peripherals to pre-PCMCIA laptops. Most of these computers had parallel interfaces, most of which were wired in such a way as to provide enough control to drive a sound card or a CD-ROM drive (for example).

Although SCSI is a brilliant idea for linking peripherals to a very small computer (one without room for an internal bus), its implementation in the PC has made it a minor pawn in the bus game. And although the parallel interface was the focus of a lot of inventive design for a year or so, it lost its spotlight when the PCMCIA standard emerged and was instantly embraced.

-ROBERT BIXBY

pins. The bus will allow quite a number of expansion cards to run concurrently on a system, like the ISA bus. The EISA bus is a 32-bit bus, meaning that it can transfer information in 32-bit chunks, matching the input/output (I/O) of the 386DX and 486 processors. The EISA standard, like MCA, also supports bus mastering.

EISA does have two inherent problems, however. To insure ISA compatibility, the bus must operate at 8 MHz. Also, since an EISA board fits into deeper slots, an EISA system cannot easily see differences between ISA and EISA boards on the same system—setting the user up for some potential addressing conflicts.

### **Local Bus**

A local bus is a data path which is connected directly to the CPU's own data bus and operates at the speed of the CPU. When computer evolution was in its earliest stages, most buses were of the local variety. The data channels were purely proprietary in

nature, designed for a particular version of a particular machine. As computers became more commonplace, and many manufacturers were creating all types of devices for them, this nonstandardized method fell by the wayside as manufacturers adopted buses such as the S-100 bus.

Recently, as the boom in graphical user interface (GUI) computing hit the industry, a performance bottleneck became increasingly apparent. The ISA bus's 8-MHz speed was simply too slow to handle the video demands of Windows, with its monstrously large, constantly changing bitmaps. The local bus seemed once again to be an answer.

Motherboard manufacturers developed proprietary buses designed to fit their own graphics accelerators, and local-bus video was born. Take a look at the mail-order computer ads from the summer of 1992. You'll find that ads for local-bus video systems abounded. (If you look very carefully, you'll find that perhaps one in ten of these systems—the most expensive ones—were touted as VESA local-bus systems. But more about this later.)

Basically, these local-bus systems were task-specific buses connected directly to the CPU's data bus before any of the other hard-wired connections or the ISA bus, thus improving performance.

While one problem was solved, however, another more serious problem surfaced. This bus had no true, binding standard. Local-bus cards bought from one company would not work on another company's computer. And in the fly-by-night world of PC clones, if a company went out of business, the consumer was out of luck in finding updated drivers to make the most of the high-speed video. I purchased a computer during that summer; it wasn't advertised as a local-bus system, but the motherboard does feature two local-bus slots. Unfortunately, the OEM company is now out of business, and the motherboard was manufactured in a faraway country, so the local bus is now only a vestigial organ on my machine, an appendix that does neither harm nor good.

### **VL-Bus**

Fortunately, the local-bus concept met with enough support to necessitate the development of a standard bus configuration. Enter VESA (Video Electronics Standards Association), an organization which represents the interests of more than 60 computer and component manufacturers, and which is developing an industrywide implementation of the local bus.

Physically, the 112-pin connectors

for the VL-Bus are placed in line with the EISA/ISA slots. The VL-Bus is a 32-bit bus which will run at the speed of the processor. Currently, the VL-Bus is optimized for 486 systems up to 66 MHz, but the standard will soon be expanded to support Pentium processors. By operating at the speed of the CPU, the VL-Bus can transfer information at a rate of over 100MB per second. The bus, like MCA, EISA, and PCI (see below), supports bus mastering.

The VL-Bus is designed primarily to provide a rabbit-quick connection for video cards, but it can also be used for other high-speed applications such as SCSI controllers or ultrafast ISDN devices. Only three components may use the VL-Bus on one computer—which is just as well, since running three devices will slow the system down considerably. This probably won't be much of a problem for single-station computers for several years, but it might be more limiting for a file server.

### PCI Bus

The latest evolution of the PC bus is Intel's PCI (Peripheral Component Interconnect) bus. Like the VL-Bus, the PCI is a standard created by a group representing the computer industry, this time the PCI Special Interest Group, headed up by Intel.

PCI is an attempt to move bus technology forward in one large step. Instead of being a local bus, connected directly to the CPU's data bus (and being tied to the processor's generation), it's an intermediate bus, which is controlled by a dedicated buffering chip. The bus is still a full-featured 32-bit data path which can operate at 33 MHz and claims (on paper, as of this writing) a data throughput speed in excess of 130MB per second.

The bus is designed to connect a wide array of components and has been forward-engineered to take advantage of 64-bit processors (read *Pentium*), cranking the speed up to 264MB per second. The bus is also engineered to work at the 3.3-volt power level of today's power-savvy processors and notebooks. The PCI version of bus mastering allows a device to utilize the bus while the processor is still processing other data.

The PCI bus is designed for plugand-play installation, meaning that no PCI board, whether video, HDTV, or SCSI, will have on-board jumpers to be set and reset. Everything is configured through software. The PCI bus will also allow shared slots, meaning that the PCI connector is placed in line with the ISA/EISA connectors, but it will not disable them. It is possible, then (for example), for a single board

### **PCMCIA**

In the world of buses, there's another standard which is rapidly growing in prominence but which isn't necessarily a bus, in the true sense of the word. I'm talking about the PC Card standard, sometimes called the PCMCIA, after the standards organization (the Personal Computer Memory Card International Association) that developed it.

The PC Card is designed primarily as an expansion system for subnotebook computers, but the flexibility of the bus means that PC Card devices will start popping up everywhere, from camcorders to desktop PCs.

The PCMCIA 2.0 Standard, formalized in September 1990, is more than just a physical bus technology; it's a standard that describes file formats, data structures, software links, and standards for accessing the card's hardware features, regardless of the type of system in which the card resides. The specification even allows for program code to execute directly from the card, independent of any system memory.

As a bus, the PCMCIA standard is a relatively primitive 16-bit pathway, but the PC Card can access up to 64 megabytes of memory, and a system could, in theory, have over 4000 cards connected to it (think of the potential for building surveillance systems!).

The PC Card is another plug-andplay card that will configure itself, but it's also more robustly designed than any of the standards mentioned in the article, meaning that unexpected power-downs, or even putting the card in its slot upside down, won't hurt either the card or the system.

The area of a PC Card is roughly the same as that of a credit card, but the card comes in three thicknesses. The thinnest, 3.3 mm, is for memory cards and nonvolatile storage systems (which keep their contents even when the computer's power is turned off). The 5-mm thickness is for such devices as modems, and the thickest, at 10.5 mm, can house miniaturized hard drives and other components that require more room.

to contain a PCI video controller and an ISA sound device.

The PCI bus is designed to handle both motherboard-mounted devices (such as a single-chip VGA system) and expansion cards; a typical PCI bus could handle three cards and four motherboard-mounted devices before becoming overloaded.

Not only has PCI has made headway into the future of the PC, but Apple has committed to the PCI bus and has joined the Special Interest Group. Soon, Apple's Macintoshes will be featuring both NuBus and PCI capabilities. It's just another sign of the evolution toward a completely modular, standardized PC architecture.

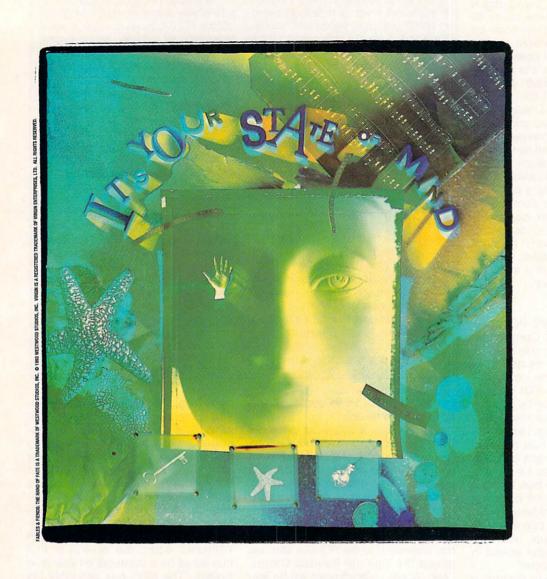
### **Transit Authority**

On the one hand, computer expansion buses are abstract concepts; on the other, they are horrendously technical conglomerations of voltage specifications and data paths. For an educated PC user, a knowledge of the basic differences and design concepts of the various buses can make that next board or computer purchase less of a mystery tour.

So, which bus is best? That's as loaded a question as you're likely to find. One thing is certain: You should stay away from proprietary local-bus systems. Their life expectancy is just too unpredictable. Is ISA dead? Not

by a long shot-and the new plugand-play standard should help it remain the de facto standard for several years to come. Even though the 8-MHz speed may seem ponderously slow when compared to VL-Bus or PCI performance, the ISA bus is a data highway that's more than wide enough for 90 percent of your computing needs. If you do a lot of graphics work, or if you're like me and live in Windows, either the VL-Bus or PCI bus would be a smart bet on your next system. The EISA bus probably fits into the smallest useful niche, as the bus of choice for LAN file servers. The 8-MHz speed is more than adequate, and the 32-bit-wide pathway will prevent bottlenecks.

As for the future of PCs, the onesystem/one-bus approach will probably no longer hold. According to Mike Bailey, chairman of the PCI Special Interest Group steering committee, computers four to five years down the road will probably feature a mixture of three buses: an ISA or EISA bus for standard devices, a local or intermediate high-performance bus (either PCI or VL-Bus) for such things as display and SCSI controllers, and a PCMCIA bus for multisystem connections. For the moment, it might be best to wait and watch, and see which bus garners the most support in terms of products being produced.



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mayhem based on preceding events. Don't just play with your mind. Change the way your mind plays.

Grasp The Hand of Fate and kiss conventional logic goodbye.

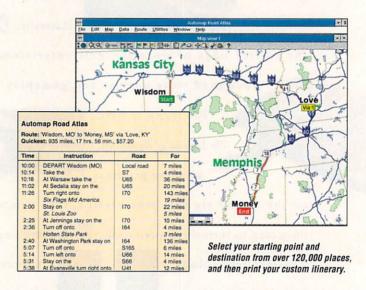
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### WHAT MAKES A **MULTIMEDIA PC?**

### BY DAVID ENGLISH

Just when you thought it was safe to buy an MPC (Multimedia PC), they introduce MPC Level 2. What's going on here? What do you really need to put together a decent multimedia PC?

First, a bit of multimedia history. When Microsoft, Tandy, AT & T. NEC, Creative Labs, Media Vision, and a bunch of other companies announced the multimedia PC in November 1990, they set the standard low so that they could sell a lot of MPCs at a reasonable price. The initial MPC standard called for a 10-MHz 286 or faster processor. At the time, there was a lot of talk about a 286 not being up to the task, but Microsoft's official line was that if a 286 could run Windows, it should also be able to run Multimedia Windows.

(Microsoft tried to discourage the name Multimedia Windows for the version of Windows that shipped with the new MPCs. Fearing that people would be confused by different versions of Windowsclearly no longer a concern-the company tried to push the more politically correct Microsoft Windows graphical environment 3.0 + Multimedia extensions 1.0.) By September 1991, MPCs and MPC upgrade kits were shipping, and

the MPC standard was off

to a slow-but-steady start. The year 1992 brought three important changes. First, the Multimedia PC Marketing Council, the body that was given authority over the MPC standard, quietly increased the minimum required processor to a 16-MHz 386SX. Second, Windows 3.1 brought the multimedia extensions (most importantly, the

sound-card and CD-ROM drivers) into mainstream Windows. And finally, we saw a gradual growth in the number of innovative CD-ROM titles, with such standouts as Just Grandma and Me, Compton's Interactive Encyclopedia, and Microsoft Cinemania.

In 1993, the titles have expanded to include such luminaries as The 7th Guest, The Animals!, and Microsoft Encarta. The year has also brought us the MPC Level 2 specification, which promises to raise our multimedia applications to a whole new level.

Briefly, the MPC Level 1 standard calls for at least a 16-MHz 386SX with 2MB of RAM, VGA display (640 x 480 with 16 colors), a 30MB hard drive, a sound card capable of 8-bit digital sound, and a CD-ROM drive that can move data at a sustained rate of 150K per second with a maximum average seek time of 1000 milliseconds. The two weakest links of the Level 1 chain are the processor (these days, you need at least a fast 386DX) and VGA display (many MPC titles either don't run in 16 colors or look pretty awful when they do; you really need 640 x 480 with 256 colors).

The new MPC Level 2 specs are designed to better accommodate the MPC titles that include photorealistic graphics and full-motion video clips (usually Video for Windows or QuickTime for Windows). The standard

calls for at least a 25-MHz 486SX with 4MB of RAM, a Super VGA display (640 x 480 with 65,536 colors), a 160MB hard drive, a sound card capable of 16bit digital sound (CD quality), and a CD-ROM drive that can move

> data at a sustained rate of 300K per second, has a maximum average seek time of 400 milliseconds. and is CD-ROM XA ready and multisession capable (for use with Kodak's

Photo CDs). Level 1 machines will still be available as lowend starter MPCs, but you should consider buying a Level 2 machine if you're looking to buy a multimedia PC. Given today's low prices, you should be able to find Level 2 MPCs for as little as \$2,500. Creative Labs (408-428-6600) and Media Vision (800-348-7116) have already announced Level 2 upgrade kits that include a 16-bit sound card and double-speed CD-ROM drive. Creative Labs' Sound Blaster DigitalEdge CD package costs \$999, while Media Vision's Fusion Double CD-16 and Pro 16 Multimedia System cost \$799 and \$1,199, respectively. All three packages include a bundle of CD-

upgrade packages are available for as little as \$400. If your multimedia PC meets the Level 2 standard in some respects but falls back to Level 1 in other respects, don't worry that you won't be able to run MPC software. Most titles won't be written exclusively for Level 2, but will simply support the higherstandard components where available.

ROM-based multimedia applications. Currently, Level 1



### MULTIMEDIA PC

### BY DAVID ENGLISH

You wouldn't watch TV with the sound turned off, yet most of us have the sound turned off in Windows. Granted, Windows isn't yet an all-talking, all-dancing, all-singing kind of operating system, but there's a lot you can do with Windows and a half-decent sound card. Over the next few pages, we'll explore what kind of hardware you'll need in order to add sound to Windows, which kinds of audio Windows can work with, and which software lets you create and manipulate this audio.

### All in the Cards

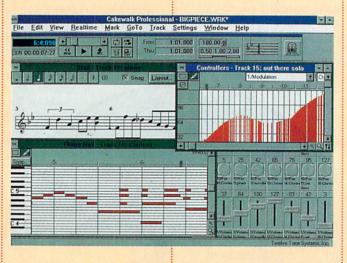
Before we talk about the wonderful things you can do with Windows and sound, we need to discuss what kind of hardware you'll need. The quick answer is a sound card and a pair of speakers. The sound card can be either an 8-bit or a 16-bit card (or one of the inbetween 12-bit cards), though 16-bit cards are inexpensive enough that I wouldn't recommend anything else these days.

When you hear people talk about 8-bit and 16-bit sound cards, they're not talking about cards that require an 8-bit or 16-bit bus. They're talking about the sampling rate of the card. A 16-bit card can theoretically sound as good as an audio-CD player (theoretically, because electrical interference from the motherboard

and adjacent cards can degrade the sound). With its lower sampling rate, an 8-bit card will have more inherent noise and won't be capable of reproducing the high frequencies that a 16-bit card can handle. In other words, a 16-bit card can sound as good as the CD player in your home stereo system, while an 8-bit card can

Yamaha's OPL2 or OPL3) for Ad Lib compatibility. This allows a sound card to play back the computer-sounding music and sound effects that DOS games have been using since the middle 1980s.

Microsoft's specifications for Windows audio include the 8-bit DAC and ADC of the Sound Blaster and the



sound only as good as an inexpensive FM radio.

The sampling portion of a sound card uses a DAC (Digital-to-Analog Converter) and an ADC (Analog-to-Digital Converter). This provides the Sound Blaster compatibility. Most cards include Sound Blaster compatibility so you can play the wide variety of DOS games that use it for realistic music, voice, and sound effects. Most cards also include an FM-synthesis chip (usually

FM synthesis of the Ad Lib card as a minimum standard. Most sound cards designed specifically for Windows also support the Sound Blaster and Ad Lib standards for DOS games, though some don't. A few cards, such as Turtle Beach's MultiSound and Microsoft's Windows Sound System, will soon offer DOS game compatibility through a small TSR program that you'll load when you boot your system.

### **Five-Star General**

Many sound cards significantly improve on the FM synthesis portion of the card by offering General MIDI, either built in or as an optional chip set. General MIDI uses the actual sounds, usually stored in ROM, to re-create musical instruments. When an FM chip creates a trumpet, it approximates the sound mathematically. When a General MIDI device creates a trumpet, it calls up the actual wave information based on the recording of a real trumpet. Most of today's professional synthesizers use this same technology to create musical instruments that are virtually indistinguishable from the originals.

General MIDI brings this highly realistic sound to inexpensive consumer products, such as computer sound cards. By 1994, the majority of sound cards should have General MIDI built in. Yamaha has even announced a new version of the FM chip, called the OPL4, that includes General MIDI.

For a preview of just how good General MIDI can sound in a computer program, check out the best-selling CD-ROM game, The 7th Guest. When installed with a General MIDI device, its music sounds like a fully orchestrated movie score.

If your present sound card doesn't have General MIDI or offer it as an add-on,

## OPEN WINDO

don't worry. Most sound cards offer a MIDI interface that can hook up to an external General MIDI device, such as Roland's Sound Canvas (\$399-\$895), Yamaha's TG100 (\$449), and Yamaha's Hello Music! (\$449).

### **Weakest Link**

So you've bought a greatsounding 16-bit sound card and maybe even have General MIDI. Now what? If you're like most of us, you'll scrimp on the speakers, possibly hooking up an old pair lying around the house. You can do that, of course, but you should consider investing in a pair of powered speakers that are magnetically shielded. You'll want powered speakers because the two- to four-watt amplifier on most sound cards just doesn't give you much volume. In fact, you can barely hear your sound card with many small speakers. Some cards also provide a separate output that completely bypasses the often-inferior built-in amplifier. You'll want magnetically shielded speakers because the magnets in your speakers can permanently scramble the data on disks you place on or even near them, as well as temporarily distort the image on your monitor if you place your speakers beside it.

How much should you pay for a pair of powered

speakers that are magnetically shielded? They start at about \$40 for the least expensive pairs from companies such as Koss and Labtech. Yamaha (714-522-9011) makes an excellent pair for \$149, called the YST-M10. For top-of-the-line sound, check out the Altec Lansing Multimedia ACS-300 (Altec Lansing Con-

sound Windows can produce. Windows 3.1 supports two major categories of sound: waveform audio and MIDI audio. Waveform audio is recorded sound that's usually stored in files with the WAV extension. Once you associate these files with a program that can play WAV files, such as Windows' Media Player

Altec files with a program that can play WAV files, such as Con- Windows' Media Player

sumer Products, 800-258-3280, \$400 a pair) and the Power Partner 570 (Acoustic Research, 800-969-2748, \$475 a pair). The Yamaha, Altec, and Acoustic Research speakers sound so good that you may also want to use them with your CD player or Walkman.

### The Sound and the Fury

Now that you have an idea of the hardware you'll need, let's look at the kinds of

(MPLAYER.EXE) or Sound Recorder (SOUNDREC-EXE), you can simply load up Windows' File Manager, double-click on a WAV file, and hear the sound. Many Windows games and multimedia CD-ROMs use WAV files, so you can give them a listen, copy the ones you like, and alter the sounds using one of the sound-editing programs that we'll look at later in this article.

While MIDI files can play music, much like WAV files,

they have a radically different structure-which gives them both advantages and disadvantages. Instead of storing the actual sound, MIDI files contain the control commands for a MIDIcontrolled musical instrument. These control commands consist mainly of note-on, note-off, pitchchange, instrumentchange, and volume information. Because a MIDI file stores only the bare essentials of a musical performance, the music in a MIDI file can take as little as 1/100 the space on your hard drive that music of the same quality would take in a WAV file. On the other hand, because a MIDI file contains only control commands, it's highly dependent on the quality and availability of a MIDI device. WAV files sound essentially the same with any sound card, while MIDI files can vary dramatically according to the quality of the MIDIbased musical instrument. In addition, WAV files can store any kind of sound, whether it's instrumental music, narration, or sound effects (essentially whatever you can record with a microphone). MIDI files can reproduce only the kinds of sounds that the accompanying MIDI device is capable of reproducing (usually 128 or more specific instrument sounds).

As if that weren't confusing enough, Windows

# VSTO SOUND



### MITTIMEDIA PC

### **Home Recording Studio**

So you bought a 16-bit sound card, high-quality microphone, and powerful sound-editing program, such as Sound Forge 2.0 or Wave for Windows 2.0. You've put together a firstclass digital home recording studio, right?

Assuming your sound card is properly shielded to protect itself from electrical interference from your computer's motherboard and other cards, you really can record audio that sounds as good or nearly as good as an audio CD.

Keep one thing in mind, though. At audio-CD quality (16-bit stereo sampling at 44 kHz), each minute you record will take up approximately 10MB on your hard drive. Before you mix down that new album you're working on, you might want to order an extra-large and extra-fast hard drive (can you say the word gigabyte without fainting dead away into your chair?). You'll also need a fast processor to handle the huge amounts of data that will be moving through your machine.

Another solution is to purchase a dedicated recording system such as Yamaha's CBX-D5 Digital Recording Processor. It's

environment. For instance, I

use the computer sound

effects

Action! and Compel.

controlled by your PC's software, but it uses its own set of SCSI-based hard drives. The CBX-D5 includes a built-in DSP (Digital Signal Processor), has DEQ (Digital EQualization), provides four-track 16-bit recording, and works with any Windows 3.1-compatible PC. Of course, you'll have to fork over \$2,995 for the CBX-D5 and another \$400-\$2,000 for a SCSI hard drive. but you did you say wanted first-class home

> manipulate sound files. In fact, with a capable 16-bit sound card and sound-editing program, you'll have the makings of a near-studioquality digital editing system. I'm not exaggerating, either; we're talking about high-quality stereo record-

THE AREA

recording studio, didn't you? from "Star Trek: The Next with programs such as Generation" for my system Second, you can add sounds. They're short and sounds to your various unobtrusive, and they cre-Windows system events. ate a high-tech mood. In While it's true that this isn't the past, I've used HAL really a serious use of 9000 recordings from the sound, that's the point—to movie 2001: A Space have some fun. It's a way to Odyssey ("Human error" for personalize your computing an error message and "I'm

> completely operational, and all my circuits are functioning perfectly" for a Windows startup sound). Sound

> > Source Unlimited (800 - 877 - 4778)sells collections of sounds from both the original "Star Trek" and "Next Generation", as well as a collection of sounds from 2001 (\$59.95 each). Micro-soft (206-882-8080)offers similar col-

lections of movie, cartoon, and musical instrument sounds, called Sound-Bits (\$39.95 each).

The third thing you can do with Windows audio is to

Wave for Window 2.0

ing direct to your hard drive, with cut-and-paste editing and nondestructive digital effects, such as echo, reverb, flange, fade, reverse, volume, and pan. Sound-editing packages such as Wave for Windows 2.0 (Turtle Beach, 717-843-6916, \$149) and Sound Forge 2.0 (Sonic Foundry, 608-256-3133, \$179) let you alter sounds in ways that

Jazz: A Multimedia History. The New Grolier Multimedia Ency-clopedia, and hundreds of other Win-dowsbased multimedia applications. You'll be ab-le to capture and play back softwarebased video files using Video for Windows and QuickTime for Windows. And you'll be able to add audio to your presentations.

Altec Lansing Multimedia ACS-300 speaker system



# SEE WHY THE WORLD IS TURNING



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### **MULTIMEDIA PC**

### **Top Windows Sound Downloads**

What are people downloading these days in audio software? Here's a list of some of the most popular audio downloads from CompuServe's Windows Fun Forum (type *winfun*). It's a good indication of what people are doing these days with Windows audio.

**Speakr.** An alternative to Microsoft's PC speaker driver. Hear WAV files through your PC's internal speaker without a sound card. 5245 downloads.

Wave After Wave 2.5. A WAV file, MIDI file, and audio-CD player for Windows that includes drag and drop, file deleting, and command line playing. 3428 downloads.

Wave Editor. Includes filtering and transform capabilities, as well as FFT transforms. 2619 downloads.

**WinWav.** Lets you attach WAV files to many Windows system events. Includes quarterly and hourly chimes. 2350 downloads.

**WavConv.** Converts sound files among the popular sound file formats. 2173 downloads.

CD Player 2.0. Lets you catalog your audio CDs by title, artist, track times, record label, and musical category, as well as play up to 30 selected tracks of your CD from Windows. 2067 downloads.

Whoop It Up!. Attach WAV and MIDI files to Windows applications, message box icons, and system events. 1989 downloads.

**Sound Blaster Pro Win 3.1 Drivers.** The latest Sound Blaster Pro drivers for Windows. 1888 downloads.

**EXCUSE.WAV.** A WAV file from "Star Trek: The Next Generation" with Data saying "Excuse me." 1857 downloads.

WinMOD Pro. A MOD file sequence player for Windows. Lets you play MOD format sound files (popular with Amiga computers) on your PC. 1127 downloads.

### **PC Sound Glossary**

ADC. Short for Analog-to-Digital Converter. A circuit that converts an analog audio signal into a digital audio signal. See also analog, digital, and DAC.

analog. An audio signal whose fluctuating voltage pattern reflects the structure of the original sound. See also digital.

CD-DA. Short for Compact Disc-Digital Audio. Also known as Red Book audio. The CD-quality audio that comes directly from a coventional audio CD or CD-ROM.

DAC. Short for Digital-to-Analog Converter. A circuit that converts a digital audio signal into an analog audio signal. See also analog, digital, and ADC.

digital. An audio signal that has been converted into

numbers that no longer directly reflect the structure of the original sound. See also **analog.** 

General MIDI. An extension of MIDI that establishes a standard set of 128 instrument sounds that are grouped in a standard order. See also MIDI.

Hz. Short for hertz. A unit used to measure the frequency of a vibrating object, such as a violin string or the cone in a speaker. Also known as cycles per second. The human ear can hear from approximately 20 Hz to 20 kHz (20 to 20,000 Hz).

MIDI. Short for Musical Instrument Digital Interface. Pronounced "middy." A digital communications protocol that allows electronic musical instruments and computers to communicate with each other. Because

MIDI sends performance information (such as note on, note off, pitch change, instrument change, and volume) rather than actual musical sounds, it's a highly efficient way to store and transmit musical data.

MIDI interface. A serial hardware device that allows a computer to send and receive MIDI data.

MPC. Short for *Multimedia PC*. Any computer, upgrade product, or software title that conforms to the standards set by the Multimedia PC Marketing Council.

multimedia. The combination of graphics, sound, animation, and video in a single software program. Sometimes only two or three of these elements are needed in order for a program to be called a multimedia program. Also, any PC, upgrade product, or

software title that conforms to the MPC standard.

sound card. Also known as a sound board. An expansion board you place inside a PC that improves the quality of the PC's sound output. A program must support the sound board before it can benefit from the board's improved sound quality.

synthesizer. An electronic musical instrument that can generate simple or complex sounds. Most synthesizers include a MIDI interface and a keyboard, though synthesizers without a built-in keyboard are becoming more common.

waveform audio. A technique for re-creating voice and sound effects using digital audio samples. Under Windows, waveform audio is generally stored with the WAV extension.

### The World's First Photorealistic Interactive CD Sci-Fi Adventure

# 



6 June 2318, 0651Z.

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Mark Rhodes, Multimedia Editor, Micropublishing News



Travel through time



Intense arcade action



Multi-level challenges

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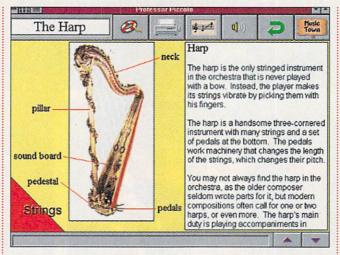




### MULTIMEDIA **PC**

completely operational, and all my circuits are functioning perfectly" for a Windows startup sound). Sound Source Unlimited (800-877-4778) sells collections of sounds from both the original "Star Trek" and "Next Generation", as well as a collection of sounds from 2001 (\$59.95 each). Microsoft (206-882-8080) offers similar collections of movie, cartoon, and musical instrument sounds, called Sound-Bits (\$39.95 each).

The third thing you can do with Windows audio is to manipulate sound files. In fact, with a capable 16-bit sound card and sound-editing program, you'll have the makings of a near-studio-quality digital editing system. I'm not exaggerating, either; we're talking about high-quality stereo recording direct to your hard



Opcode Interactive's The Musical World of Professor Piccolo

drive, with cut-and-paste editing and nondestructive digital effects, such as echo, reverb, flange, fade, reverse, volume, and pan. Sound-editing packages such as Wave for Windows 2.0 (Turtle Beach, 717-843-

right? Not exactly. There

are several ways you can

add sound to your Win-

dows-based laptop.

6916, \$149) and Sound Forge 2.0 (Sonic Foundry, 608-256-3133, \$179) let you alter sounds in ways that recording studios would have killed for just 10 or 15 years ago. Turtle Beach also offers an excellent

introductory sound package for Windows, called Turtle Tools (\$89). It includes a relatively powerful wave editor, several useful MIDI utilities, and a CD-ROM with over 300 sound effects and musical pieces.

### Sound Off

I've only skimmed the surface of what you can do with Windows and sound. With a sound card becoming a necessary component of any new PC and talk of adding audio circuitry to many new motherboards, expect to see some exciting new audio technologiessuch as voice recognition and video conferencingbeing integrated into your everyday computing environment. With all this new audio technology, you won't be able to keep Windows quiet any longer.

### How to Add Sound to Your Laptop

Laptops run on batteries and can't use sound cards, so you can't have sound on a laptop,

Buy a parallel-port sound device. These small boxes plug into your parallel port and offer sound that varies from adequate (when using the device's built-in speaker) to excellent (when connected to high-quality speakers). Most work well with Windows programs, with

full support for WAV files and limited support for MIDI files (using FM synthesis). DOS support is also limited, varying from no DOS support (Logitech's AudioMan) to support for most DOS programs only when they run under Windows (Media Vision's Audioport) to support for most DOS programs running under DOS (DSP Solutions PORTI•ABLE These Sound Plus). devices run on batteries, so they won't directly drain your laptop's own batteries, though you may encounter some slight drain from the additional use of the parallel port.

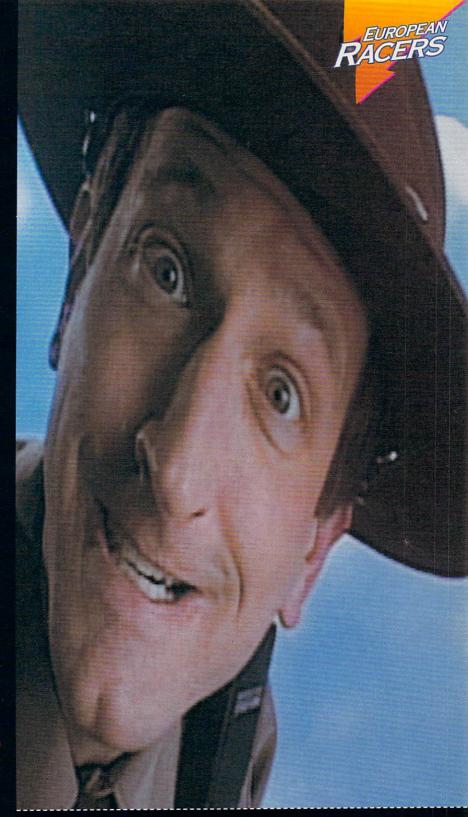
Buy a PCMCIA sound card. If you have a laptop with a Type II PCMCIA slot, you can use the MediaShare Tempo (MediaShare, 619-931-7171, \$295). It's a PCMCIA sound card that can play WAV and MIDI files in Windows and is compatible with DOS software that supports the Ad Lib and Sound Blaster standards. It even has provisions for a MIDI interface.

Try a PC speaker sound driver. Microsoft has developed a driver that lets your PC speaker play back WAV files. With some PCs, you can barely hear the sounds; with others, you may have interrupt problems in Windows. You can often find it online (on CompuServe, type go msl and download SPEAK-.EXE), and it's included in Sound Source Unlimited's WAV file collections. Even if you do get it to work, you'll find it doesn't work well with all kinds of sounds. Still, it's worth a try.

Build an insanely sports ca as Tast possible And laugh in the face of authority.



{ Just don't cry when you're sharing a cell with a big fat guy who picks his nose.}



The game has tons of cool video clips just like this one. Only different



Break all kinds of laws in one of four European Racers. Integrated video clips give tips on equipment and weather conditions while you try to outrun the cops and race on four different tracks. 3-D animated instructions help you build a model of your car so you can remember what it looks like after you wrap it around a guard rail. Available for IBM on CD-ROM and Sega CD.



The model makes the game better. The game makes the model better.®

Circle Reader Service Number 13



### NEW MULTIMEDIA PRODUCTS

Edited by Lisa Young and Phillip Morgan

### **OPEN WINDOWS TO FUN**

Daily computer chores can get monotonous, but Moon Valley Software has developed a new multimedia product that will open your Windows to fun by replacing standard screen graphics with animated icons, cursors, and backdrops.

ROMaterial uses sight and sound as a weapon against boredom. Replacing ordinary wallpaper, ROMaterial's backdrops are color images that come to life as moving pictures. Fifty of the most popular icons in Icon Hear-It and Icon Do-It.



Moon Valley's ROMaterial

including the familiar happy face and oversize arrow cursors, are also featured with Moon Valley's new creations.

As you sift through the Windows menus and dialog boxes, you can hear any combination of impressions, languages, and sounds. ROMaterial features many of the sounds found on the original Icon Hear-It along with new vocal effects, including the voice of Ross Perot, the calls of animals, and the sounds of musical instruments.

ROMaterial requires Windows 3.1 and a CD-ROM drive.

Moon Valley Software (800) 473-5509 \$29.95

Circle Reader Service Number 530

### MORPH TRANSFORMS WINDOWS

With Gryphon software's Morph for Windows, you can create the same special effects on your home computer that were used to transform objects in movies such as *Terminator II* and *Jurassic Park* and on recent television commercials.

Morphing is a twodimensional special effect that smoothly transforms one still image into another. Time used this technology when promoting its "Agony in Africa" issue. The magazine's commercial began with the image of a young child, which transformed into a skull and then became an image of the African continent. Crest also used morphing to advertise its baking soda toothpaste in a commercial. It began with a box of baking soda, which changed into a tube of toothpaste.

You can save each morph as a Video for Windows movie, or an FLI or FLC animation, and place it on videotape or film for commercial-quality output.



Morph for Windows

You can also save a single still image or series of images in a variety of common file formats including TIFF, GIF, and Targa.

Gryphon Software (619) 536-8815 \$169

Circle Reader ServiceNumber 531



FlexCam from VideoLab

### MULTIMEDIA COMES HOME

Now you can generate complete multimedia productions on your home computer with VideoLabs' FlexCam, the first integrated color camera and microphone system designed for desktop video and communications.

The FlexCam incorporates a high-resolution, color CCD camera and two microphones. It outputs color NTSC video and industry-standard, line-level audio to VCRs, video conferencing systems, and any other product that accepts NTSC or PAL video. Mounted on an 18-inch flexible wand for precise campositioning, the FlexCam is compatible with all popular video digitizing boards offered for Microsoft Video for Windows.

Because of its unique design, you can position the FlexCam directly in front of the screen for true eye-to-eye contact. With other systems, the camera is located to the side or on top of the computer, and you can only see the profile of the user. The flexible neck is also ideal for document capture and other desktop video uses.

VideoLabs (612) 897-1995 \$595 (in the U.S.) \$695 (elsewhere)

Circle Reader Service Number 532

### LAPTOP VIDEO

The Presenter Video Capture, introduced by Consumer Technology Northwest, combines video transfer technology with the convenience of laptop and notebook computers. The portable unit lets you convert still images from a video-recording device into a computer-generated document.

Compatible with all DOS and Windows applications, the Presenter Video Capture can scan full-color video images with as many as 32,768 colors. You can use it with video recorders, digital cameras, camcorders, and any NTSC input device.

Weighing only 5.35 ounces, the Presenter Video Capture can be conveniently carried with your laptop or notebook computer, though it can also be used with any desktop. The unit simply plugs into a parallel port. All the required hardware and software are included in the package.

Consumer Technology Northwest (800) 356-3983 \$319

Circle Reader Service Number 533

### MULTIMEDIA BY SUBSCRIPTION

Newsweek InterActive, a multimedia CD-ROM magazine created by the editors of Newsweek, is now available quarterly by subscription or by single issues at leading retail stores.

Each quarterly edition will include as many as three original articles on current

## OFT KARAOKE



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Lyrics appear verse by verse and light up to the right beat. Simple commands allow you to enjoy karaoke fun like never before. You can select your favorite song, change any or all the musical instruments, and adjust the volume of individual tracks. Do you have a hard time hitting those high notes? No problem... just lower the pitch to match your range! Is the song too fast for you to keep up? Slow it down! SOFT KARAOKE brand software is the first and only karaoke that allows you to set the pitch and speed of the music to your liking! Great for parties as you entertain your friends (or let them entertain you) by singing all the greatest hits. You might even ask your boss to sing along at a "Happy Hour" office party (at the end of the evening)! With the mike in your hands and the words on the screen, you'll be all set for the newest entertainment experience on PC!

All kinds of songs, all kinds of stars
SOFT KARAOKE brand software plays SOFT KARAOKE LPs which include
songs made famous by star like Elton John and Madonna. All songs come in MIDI KARAOKE file format and respect their original orchestrations. Whatever your tastes, there's a SOFT KARAOKE LP for you!

Just what your sound board was designed for Finally, a multimedia product that uses your Soundblaster, Adlib, or other popular sound board to its full extent whether it is the Wavetable lookup or FM synthesis type.

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Act quickly and get a sleek microphone with your SOFT KARAOKE brand software! Designed to plug into your sound board, it will come in handy for your singing and other multimedia needs. Hurry! Offer is available while supplies last!



Call toll-free 1-800-363-TUNE Or see your nearest dealer

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THE UNIVERSAL NETWORK OF ENTERTAINMENT



### NEW MULTIMEDIA PRODUCTS



Newsweek Interactive

news topics. The format combines text, audio, video, animations, narration, and photo essays into easy-touse multimedia presentations, including interactive simulations that let you get personally involved in the news. Three months of Newsweek print editions and hundreds of articles from the Washington Post are included and can be searched by keyword. Also in each issue are broadcast interviews from "Newsweek on Air," a coproduction of Newsweek and The Associated Press Radio Network.

Newsweek InterActive is published for IBM-compatible computers with CD-ROM drives, as well as the Sony Multimedia CD-ROM Player. Additional formats will be available in the future.

Newsweek (800) 634-6850 \$129.95 (per year) \$49.95 (per issue)

Circle Reader Service Number 534

### **CHECK IT OUT**

Your next visit to the local library could bring a few surprises. On the shelves next to the books, you may find an assortment of CD-ROM titles that you can check out and enjoy in your own home.

Compton's NewMedia, a publisher and distributor of CD-ROM titles, is offering libraries a specially marked series of reference, music, travel, business, and children's titles. Packages are available in assortments of 10, 20, and 40 titles and include display holders that make it easy for libraries to promote their new CD-ROM collections.

The library lending program is based on a similar program for video rental stores launched by Compton's NewMedia earlier this year. Following multiple reorders from the video stores, Compton's NewMedia has increased both the number of titles and the number of participating stores.

Under current law, software rental is illegal without approval from the software publisher. In this case, Compton's NewMedia has obtained the rights and will provide special discs and packaging earmarked for lending only to the participating libraries and video rental stores.

Compton's NewMedia (800) 344-2621 \$1,700 to \$3,800

Circle Reader Service Number 535

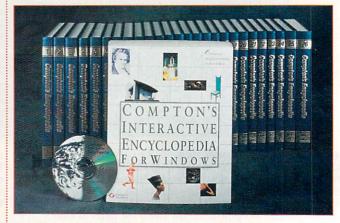
### MULTIMEDIA GOES MULTIMARKET

It may be some time before pixels supplant the printed word and bookstores become disc stores, but CD encyclopedias have already made their way onto booksellers' shelves. Compton's Learning Company and Compton's New-Media have put together The Compton's Combo, a true multimedia package to market through bookstores and software stores alike. It includes both the printed and CD-ROM versions of the 9-million-word Compton's Encyclopedia.

The package you buy in the store includes the first volume of the printed encyclopedia, as well as Compton's Interactive Encyclopedia for Windows on CD-ROM. The CD-ROM version includes the complete text of the printed version; sound, animation, and full-motion video; and Smar-Trieve, for natural-language text search. A mail-in coupon is included for the other 25 printed volumes, which will be shipped to you at no additional charge.

Compton's NewMedia hopes the Combo will encourage booksellers to add addialready available.

The system has an active vocabulary of 1000 words taken from a base vocabulary of 20,000. Developers can extend the vocabulary to include industry-specific terminology. Unlike many speech systems, ICSS doesn't require a pause between words or special training for users. According to IBM, number recognition will be highly accurate, so entering long lists of numbers into a spreadsheet won't be as tedious as it is



The Compton's Combo from Compton's NewMedia

tional CD-ROM titles to their shelves as CD-ROM drives become more common.

Compton's NewMedia (619) 929-2500 \$498

Circle Reader Service Number 536

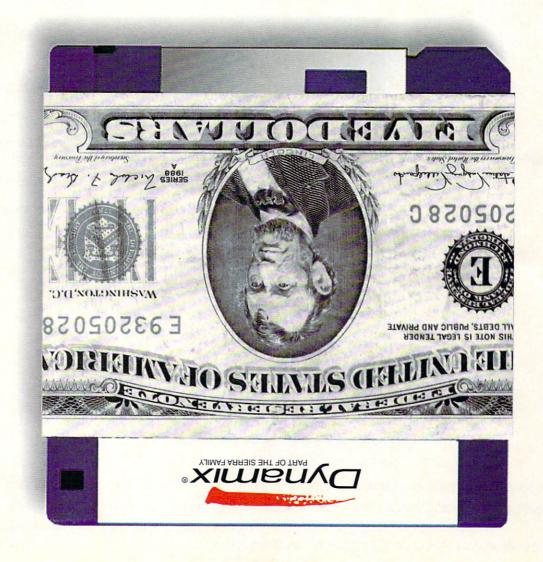
### CAN YOU SAY "SUI"?

Talking to your computer might not be as futuristic as you think. IBM has announced a developer's toolkit that will allow software makers to produce Speech User Interfaces (SUI) for their Windows applications.

The IBM Continuous Speech Series (ICSS) for Windows is scheduled for release by the end of 1993. OS/2 and AIX versions are with a keyboard. Typos and transpositions could be virtually eliminated.

Lotus displayed a demo program of 1-2-3 using ICSS for OS/2 in IBM's booth at the recent PC Expo in New York. WordPerfect showed its demo based on IBM's Speech Server Series (ISSS), a related technology. Neither company has committed to IBM, but it's apparently a strong contender. Future applications from these and other companies will likely use voice recognition for both navigation and dictation.

IBM (800) IBM-CALL



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FREE SPECIAL EDITION VERSION OF THE EVEN MORE INCREDIBLE MACHINE, FEATURING 10 PLUS A SNEAK PREVIEW OF THIS CHRISTMAS' HOT ITEM - SID AND AL'S INCREDIBLE TOONS...

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|        |                 | YOU'LL FLY AIR-TO-GRO              | ACES OVER EUROPE: IN THIS GAME                    |
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THEN SEND THIS PAGE TO US - AND WE'LL SEND YOU THE GOODS!!

SID, AL, AND EVEN MORE PREVIEWS COARSEGOLD, CA 93614

OFFER GOOD THROUGH FEBRUARY 28, 1994. THIS OFFER IS NOT VALID WITH ANY OTHER COUPONS OR PROMOTIONS. LIMITED TO ONE DEMONSTRATION DISK PER HOUSEHOLD. THE EVEN MORE INCREDIBLE MACHINE DEMO IS AVAILABLE FOR BOTH THE MAC AND LIMITED TO ONE DEMONSTRATION DISK PER HOUSEHOLD. THE EVEN MORE INCREDIBLE MACHINE DEMO IS AVAILABLE FOR BOTH THE MAC AND PRICES.

### BANKS, LONG, WHITE HARRIS AND TAYLOR AND TAYLOR CRUSH BLEDSOE CRUSH BLEDSOE LIKE AN ACCORDIAN.

(HIT ESCAPE AND SELECT A BETTER PLAY.)

tired? Give him a rest. Your quarterback isn't cutting it? Trade 'em. Hate Dallas? Make 'em wear pink.



Front Page Sports: Football Pro.

It's football the way it was meant to be...with you in control.



Available at retail for IBM/compatibles. Or call 1-800-757-7707.

> stats. This is your chance to coach your way out of a paper bag.

So pick your team, call the plays, and watch your

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You control every last

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Or quit and start a new game. Because this is your turf. Your rules. Your game.

Front Page Sports: Football Pro. The real thing. For the die-hard fan who lives for Sunday



afternoons and can't stand the thought of the off-season.

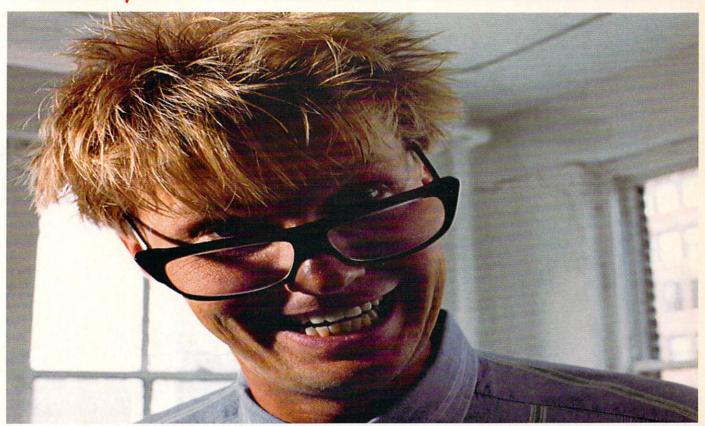
You don't just control the game. You control the whole NFL league. With real NFL rosters and





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### KEVIN'S GOT WAY TOO MUCH TIME ON HIS HANDS.

The Even More Incredible Machine. Even more incredible than the original. We're

> talkin' Computer Game Review's "Puzzle Game of the Year." It's our

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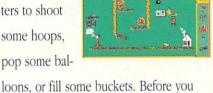
the obsessive-compulsive lurking within you.

It starts off innocently enough. Creating

elaborate contraptions by rigging conveyer belts, bellows,



and teeter-totters to shoot some hoops,



loons, or fill some buckets. Before you know it, you're spending hours shooting goldfish, pushing cats off cliffs, and feeding little men to alligators. Yes, alligators.

And as if that's not enough, there's over 70 new puzzles, 11 new tools, and a free form mode so you can create your own puzzles and drive your friends crazy. Just like Kevin did to you.

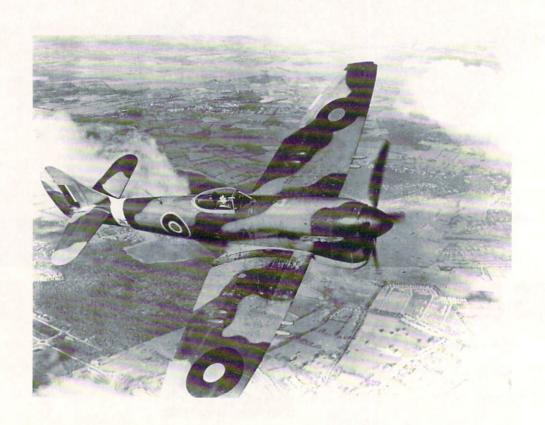
Kevin's crossed that fine line between genius and insanity. Why not join him?



Available at retail for IBM / compatibles, Windows, Macintosh. \$19.95 updates for registered owners. Call 1-800-757-7707



# YOUR BELLY TANK IS ON FIRE. YOUR RADIO IS GONE. YOUR AIR FIELD IS 135 MILES AWAY. GODSPEED.

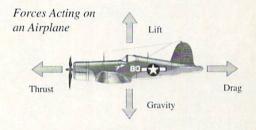






SOAR THROUGH
FLAK-FILLED SKIES IN
THE COCKPIT OF YOUR
SUPERMARINE
SPITFIRE. OR ONE OF
15 OTHER AIRCRAFT
FROM THE INFAMOUS
SECOND WORLD WAR.

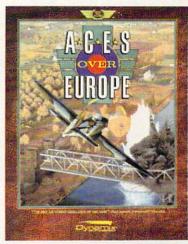






FLY ALL NEW AIR-TO-GROUND MISSIONS, TAKE OUT ENEMY BRIDGES, AND STRAFE ARMORED VEHICLES. FACE OFF AGAINST FAMOUS WWII ACES SUCH AS ADOLF GALLAND AND HUB ZEMKE.

SHIPS BURN IN THE
WATER. OIL DRUMS
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YOU'RE FLYING FOR THE
BRITISH RAF ONE DAY.
THE GERMAN
LUFTWAFFE, THE NEXT.



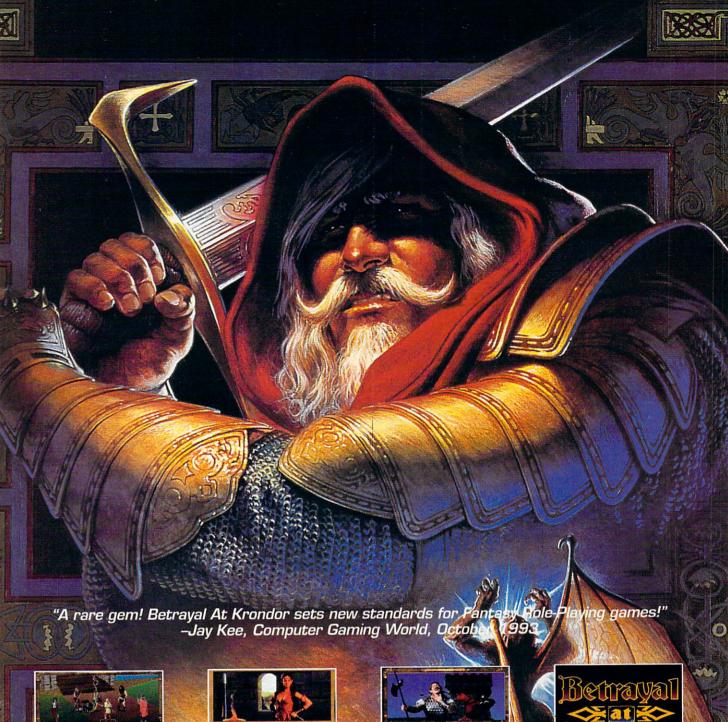
AVAILABLE AT RETAIL FOR IBM / COMPATIBLES. OR CALL 1-800-757-7707.

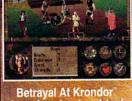
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224 MILLION SQUARE
FEET OF FORESTS,
SWAMPS, MOUNTAINS,
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AND BLOODBATHS.







Betrayal At Krondor is a nine chapter virtual fantasy universe of magic, adventure, and bloodshed



Digitized actors and scenery combine with our famous 3Space technology to create a labyrinth of worlds within worlds.



building your skills, ratings, and strengths you battle bloodthirsty rmies at every turn.



Betrayal At Krondor is based upon best-selling author Raymond E. Feist's Riffwar Legacy, Experience the betrayal. Welcome to Krondor.



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## FRONT PAGE SPORTS

# IT'S MINUS 25 DEGREES, WINDS ARE HOWLING AT 45 MPH AND THERE'S TWELVE FEET OF SNOW ON THE GROUND.

### **FOOTBALL ANYONE?**

That's right. Football. Yeah, in this weather. What are you a wimp? This is how football was meant to be played.



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You're not just coach for a day. You run the whole league for the whole season with real NFL rosters and stats.

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You're the coach so you control everything, from designing your own plays to signing free agents and making trades. There's even a college draft! Sub

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Design uniform colors.

This is your chance to prove you can coach your way out of a paper bag. So pick



your team, call the plays, and watch your players spin, flip, dive and risk career-ending injuries.

Front Page Sports: Football Pro. So real, you'll wish you were wearing a helmet.





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NEW MULTIMEDIA PRODUCTS

\$299 (single user, standard microphone)

\$699 (single user, highquality microphone)

Circle Reader Service Number 537

# **WALK SOFT RUNS** HARD NEWS ONLINE

Hold the presses—in fact, forget the presses. Walk Soft has taken the paper out of newspaper and replaced it with your computer monitor, complete with sound and animation. News in Motion is the first online multimedia newspaper in the U.S. It's currently available as a weekly, but it will soon be issued as a daily (Monday through Friday).

You can download the "paper" every Saturday or have it sent to you on disk. You'll need Windows 3.1 and DOS 5.0 or higher. Its news and editorials come from agencies around the world: Reuters, The Economist, Le Monde, Asahi Shimbun, Der Spiegel, and others. Color photos, graphics, and political cartoons accompany the text, and sound and animation bring the news to life.

News in Motion also includes the soft news and fluff that so many readers find endearing in their favorite news magazines and papers. It has animated horoscopes and comics, the Frugal Gourmet, and defense coverage from Jane's Defense Weekly.

Subscriptions are available for 1, 3, 6, and 12 months. Rates are higher than for weekly news magazines or daily papers-\$4.80 per issue for a 12month subscription-but downloading is toll-free if you use a 9600-bps or faster modem.

Walk Soft (716) 271-8250 \$250 (12 months)

Circle Reader Service Number 538

# IT'S NOT THE CARD YOU HEAR

As any audiophile will tell you, the best stereo in the world sounds only as good as its speakers. Since the same principle applies to computer sound systems, your choice of speakers is as important as your choice of a sound card.

The ACS50 amplified speaker system from Altec Lansing offers you many of the features of high-fidelity home-audio speakers and amplifiers. The two-way speakers have 2 1/2- x 1 1/4-inch midbass drivers and 3/4-inch ferrofluidcooled dome tweeters. They're magnetically shielded so you can place them beside your monitor without interference, and they're matched with the amplifier for optimum frequency response.

The amplifier mounts onto your monitor, so the





Vdeck 500 from Sony Computer Peripheral Products

headphone jack and volume control are on the front of your computer rather than on the sound card. Circuitry for bass and treble boost are built into the amplifier.

Altec Lansing (800) 258-3288 \$100

Circle Reader Service Number 539

# VDECK, VISCA, AND OTHER VIDEO VERNAC-ULAR

Sony has added a second 8-mm VCR to its Vdeck series. Like the first Vdeck (the CVD-1000 Hi8), the new Vdeck 500 was designed to be a computer peripheral rather than simply a VCR you can connect to your computer. Sony's Video System Control Architecture (VISCA) is built into the deck, so you can connect it directly to your computer and control it with your video-editing software using VISCA drivers.

The Vdeck has a number of professional features for precise editing, including time coding for highly accurate searching and dubbing, input and output jacks for !

communicating with other devices in a VISCA daisychain, and voice boost for voice enhancement and background noise reduction.

You can also expect to see more video software for Windows. Microsoft has incorporated VISCA protocol into its new Media Control Interface (MCI) drivers. Software developers can use these drivers to create video-editing software that can control your camcorder, VCR, and other video devices. The platform-independent VISCA protocol has already been used in drivers for Macintosh and other systems. but the system-level support offered by Microsoft's new MCI drivers should prompt many new PC applications. Desktop video may soon be as common as desktop publishing.

Developers can download the new drivers from Sony's Bulletin Board Service at (408) 955-5107.

Sony Computer Peripheral Products (800) 352-7669 \$1.099 Circle Reader Service Number 540



# SPOTLIGHT

# PC KARAOKE AND SOFT KARAOKE

These days, nightclubs are famous for their karaoke machines, which encourage fun-loving (and often alcohol-sodden) folks to get up in front of a crowd and bark out a hit song, all to the recorded accompaniment of a full ensemble and background singers. Now, two new software products. Karaoke (Sirius Publishing, 602-951-3288. \$99.95) and Soft Karaoke (Tune 1000, 800-363-8863, \$49.95), let you do your crooning at home. And while both products do a great job of replacing the standard karaoke machine. they're as different as Frank Sinatra and Nirvana.

PC Karaoke is, from an options point of view, the simpler of the two products. A CD-ROM-based Windows program that features 256-color graphics, studiorecorded music, and action video sequences, PC Karaoke synchronizes onscreen lyrics with the beautifully arranged and professionally recorded songs.

When you run the program, you see a full-screen graphical menu depicting the songs on the current disc. To choose a song, simply click on its picture. The song's graphic then fills the screen, after which the song loads and begins to play, highlighting the lyrics on the screen as it goes.

If you want to sing along with all 12 of the musical selections on the disc, you can click on KJ's Top 12 Countdown. This brings up a karaoke jockey (the karaoke version of a disk jockey), who gets you started on your musical tour and pops in now and then with some humorous silliness.

Extra song discs are available from Sirius for \$15.95 each. The current catalog features 40 discs that cover all kinds of music, from Broadway show tunes and movie soundtracks to hard rock and rap. The disc that comes with PC Karaoke features a wide range of including selections. "You've Lost That Lovin' Feelin'," "Twist and Shout," "Everything I Do," and "Friends in Low Places"-12 songs in all. The packrange). In addition, the volume control panel lets you set each individual instrument's volume, and the instrument control panel lets you assign any one of dozens of different instruments to any instrument track in the song. Of course, with the main control panel's controls, you can play, pause, fast-forward, and reverse the current song, much as you can with a tape deck.

To get this manipulative power, however, you have to

such favorites as "Dust in the Wind," "Stand By Your Man," and "The Way We Were." Additional disks containing ten songs each sell for \$19.95 per disk. In its current catalog, Tune 1000 offers 28 disks; these include the usual assortments as well as collections by specific artists such as Fleetwood Mac, Michael Jackson, Frank Sinatra, and Elton John.

Which product is better? That depends on what's most important to you. PC Karaoke is a sound and graphical delight (with a price tag that reflects this), but it allows no manipulation of instruments. If you like to fiddle with your music, and are willing to forfeit some sound quality and the fancy graphics, Soft Karaoke's powerful control panel will keep you busy for hours.

The bottom line is that both are excellent products. differentiated enough from each other that they will appeal to different segments of this niche market. Both products install easily and work right out of the box-as long as you have your Windows multimedia drivers and mixers set up properly. Both include a starter set of songs (although Soft Karaoke includes only 5, compared with PC Karaoke's 12), and both include microphones (although PC Karaoke's microphone is of a higher quality).

Whichever program you pick, you'll be able to enjoy the karaoke experience in your own home—which will go a long way toward making your next party the hit of the block. But do your friends a big favor: Practice in private first.



One of the 12 songs that are included in PC Karaoke

age includes a certificate for two additional discs.

While PC Karaoke's CD-ROM format offers greater sound quality, Soft Karaoke's MIDI format (no CD-ROM drive required) offers greater flexibility. When you run Soft Karaoke, a tape player-like control panel appears. Using the control panel, you can not only load and run song files, but also manipulate the files in various ways.

For example, you can change both the tempo and key (changing the key is especially valuable for people with a limited vocal

give up a certain amount of sound quality. This is because MIDI files aren't actual sound recordings but files that control MIDI instruments. To put it simply, all the sounds you hear with Soft Karaoke are generated on a synthesizer, either your sound board or some other external MIDI instrument. The actual quality of the sound depends on the quality of your synthesizer. (It's worth pointing out that much of today's natural-sounding music is actually created with MIDI synthesizers.)

especially valuable for people with a limited vocal five song files, including

# The Labyrinth of Time

(on c.d.)



The Labyrinth of Time. An epic fantasy of time travel and adventure, possible only on CD-ROM. The legendary King

Minos has commissioned a labyrinth bridging time and space.

You must overcome the power of Minos and destroy the labyrinth by manipulating the very fabric of history. But

beware, the future may not unfold in quite the way you planned.









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ELECTRONIC ARTS

95¢ for the first minute, 75¢ for each additional minute. If under 18, get parents permission before calling. Requires a touch-tone telephone. Messages subject to change without notice.

# PRODUCTIVITY CHOICE

This innovative box of tools manages to be both accessible to the beginner and deep enough for the power user.

Tom Campbell

# PC TOOLS FOR WINDOWS

Central Point's PC Tools for Windows is bigger and sleeker (and more expensive) than its DOS version. If you're ready for its fresh new feature mix, you'll find it's the Lexus of utility packages: big yet swift, elegant yet fully functional, more expensive than last year's model yet still a great value.

This Windows version of PC Tools is a distant relation of its smash-hit DOS counterpart. It contains a replacement for the Windows desktop, a File Manager replacement, a backup program, data recovery for thrashed disks or files, an antivirus utility, a system analyzer, a disk optimizer, and a BASIC-like scripting language.

There are a few extras thrown in too, such as a scheduling program originally designed to run the backup program but now of general-purpose use, customization that lets you make extensive changes to the user interface in all of the applications, and some wildly creative but undocumented screen savers.

Users of the DOS version will note that the telecommunications, database, notepad, and outliner modules are missing and presumed dead: Central Point found that either Windows had these features already or too few users took advantage of them. I miss the multiwindow notepad and the database manager.

It's within Multidesk, the program's replacement for the Windows desktop, that some of the best features are found. Multidesk knits everything together and makes



good on its promise of offering an improvement over Windows' own desktop. Not only is it arguably easier to learn and use, but it's also demonstrably superior. The best features are QuickLauncher and multiple desktops. Quick-Launcher lets you add program or folder names to the System menu and launch them from there, sort of like desk accessories on the Macintosh. As with the Mac, Windows is a multitasking operating system that presumably makes this approach redundant. Yet, as anyone who's ever used desk accessories on the Mac will tell you, doing things this way is so much easier than switching to the desktop to run a program that it makes perfect sense once you've given it a test drive.

Perhaps Multidesk's most innovative feature is its multiple desktops, which I find much harder to explain than to use. Instead of being limited to one desktop, you can have as many as you want. You select among these desktops by way of a floating palette (or a menu, if you don't want the palette around). The palette shows miniature yet fully functional versions of each of your custom desktops. It's sort of like groups in Program Manager, but it's abstracted to the desktop itself.

At first I thought this would be a "Who needs it?" feature, but I found myself relying on it more and more. I had already patched together a clunky approach groups with Program Manager. When I realized this, I converted to Multidesk and didn't look back. Plus, I was able to employ some other working habits I'd planned to acquire with Windows 3.0. Multidesk's folders, which act like supergroups, can be nested, allowing me to make use of the hierarchical organization I had expected Windows to give me.

All of this presupposes a pretty complex hard disk layout, perhaps one on a network; for someone who runs only one or two applications, Multidesk is probably overkill. As someone who lives in Windows all day, I found the transition to PC Tools smooth and

natural, but I wondered if it was for everyone.

Eventually I realized that almost everyone using Windows 3.1 applications probably has a pretty big hard disk because the new apps all seem to take 10, 20, or 50 megabytes, strewing complex directory structures and hundreds of files in their wake. So SmartFind was a welcome relief. It lets you search for a file on the hard disk or for text within a file. SmartFind does the expected but extends it dramatically, allowing you to use dates, file attributes, and wildcards in one unbelievably swift package.

SmartFind, and indeed all of PC Tools, worked just great on a network. And while our network is notably lax (everyone uses the same password), there are dozens of customizing and security options for those in more demanding situations. I've never encountered an easier product from the network administrator's point of view that was equally simple on a one-user system.

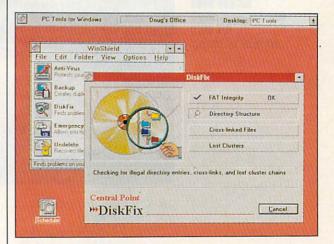
ScriptTools, the package's macro language, is the best such Windows script language I've seen. If using batch files is your idea of automating tasks, you'll be in for the thrill of your life when you play with ScriptTools. It's a BA-SIC-like language with jillions of Windows-y features. With it, you can create dialog boxes, access the Clipboard, time events, maintain control over the keyboard, gain access to DLLs, execute network-related commands, and more. If you're not a programmer, you'll use ScriptTools to record scripts, as you do with Windows' own Recorder. But ScriptTools comments on your scripts, offering a matchless opportunity to teach the patient nonprogrammer how to program. I've seen a lot of Windows batch languages, and this one is tops.

PC Tools has a whole range of file-recovery programs. The installation process gives file recovery top priority. If you've bought the product because of a hard disk crash, because your hard disk's FAT has been fried, or because you want to recover a damaged dBASE file, the installation program won't copy the PC Tools files onto your hard disk until you've taken care of the problem. It promotes preventive medicine. leading you through the creation of a disaster-recovery disk and even offering a selfstick label for the disk.

In a package this big, you're sometimes lucky enough to get a fortune cookie—one of those seemingly quirky little surprises that threatens to turn into a fulltime hobby. In the case of Windows 3.0, it was Solitaire. In 3.1, it was Minesweeper. In PC Tools, the screen savers seem to fall into this category. Not even mentioned on the box, in the manuals, or in the README file, they're apparent only to the sharp-eyed during installation. Nothing is said other than that you can leave them out of the installation. To see them, you need to open the Windows Control Panel, choose Desktop, and go to Screen Saver. I'll leave the rest a surprise, except to tell you that Food Fight is my favorite, even though it needs an 80486 to really do its thing.

I had a few problems with the package, all small. The manual is hideously underindexed (the box trumpets PKZip file compression and decompression, for example, but neither ZIP or PKZip are in the index). The tape backup software actually replaced the original tape backup software that came with my CMS backup without telling me, rendering the tape drive useless when I was told to reconfigure it for PC Tools. While PC Tools' tape backup software decided to remove all traces of my original tape backup

IBM PC or compatible (80386 compatible). 4MB RAM. Windows 3.1 or Windows for Workgroups, hard drive with 5-14MB free (depending on the number of



software, it couldn't figure out the proper IRQ and DMA settings for my CMS tape drive, and I'd left the original manual in storage during a move. Of course, I couldn't find CMS or Colorado Mount Systems in the index when I went to look up the problem.

Still, PC Tools for Windows gives you a really big bang for the buck. Like very few other Windows products, it manages to be both accessible to the beginner and deep enough for the power user. Like even fewer multipurpose products, it does a great job with everything it sets out to do-without getting in your way.

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modules installed), Microsoft-compatible mouse-\$179.95

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# PERSONAL PRODUCTIVITY

William Harrel

# RESOLUTION

Just when you think an industry standard has been set. somebody moves the mark. All of the major manufacturers are championing low-cost 600-

dpi printers.

There's nothing new about 600-dpi printers. High-end desktop publishers and graphics designers have used 600-, 800-, and 1200-dpi devices for a few years now. Until recently, high-resolution printers have been too expensive for personal use. Today you can buy one, such as the HP Laserters with diagonal legs, such as M, V, and W, print with jaggies (stairstepping). Small type can print with strokes (fine lines) broken up, or with circles (b, d, p) filled in. Higher resolution helps maintain fine lines and stroke weights in small text, and large text printed at higher resolution has smooth, sharp edges.

But where you'll really notice a difference is in graphical and gray-scale (photograph) images. Some graphics contain tight arcs and angular lines that 300-dpi printers can't print without jaggies.

dependent graphics, such as those created by Corel-DRAW!, Micrografx Works. and other draw programs. Screens create shading and other gray fills, such as Corel's graduating linear and radial fountain fills.

For many applications, 600dpi resolution proves good enough for camera-ready art that is to be reproduced. Printers with 600-dpi resolution also make better proof printers. However, when you need perfect text and graphics, you'll still need to run your documents on an imagesetter at the neighborhood service bureau. Toner-what the printer uses to print-is still toner; it cannot produce fine lines and grays as well as imagesetters. even though today's toner is much finer than that of just a few years ago.

Not only do you get improved text and graphics from these new high-resolution printers, but they also print faster. New RISC processors and other innovations, such as improved parallel ports, halve the processing time. The Lexmark 4029's parallel port, for example, can accept two or three times more data per second than the ports of 300-dpi printers developed a few years ago. Several printers, such HP's LaserJet 4, are built around Intel's 20-MHz 80960 RISC processor. which processes data at breakneck speeds and requires less printer RAM, making the printers less expensive to produce and upgrade.

Other innovations, such as windows accelerators, also turn in record printing times. These combination softwarehardware solutions use your computer's memory, True-Type fonts, and souped-up printer drivers for speeds as much as ten times faster than those of printers that do not support such solutions.

Do you need 600-dpi resolution? It's all a question of image.



Jet 4, for less than \$1,500 (if you shop around).

Why 600 dpi? Twice the resolution means twice the quality, right? Actually, 600-dpi resolution is four times higher than 300-dpi resolution.

In applications where the information is more important than the packaging, such as word processing and spreadsheets, 300 dpi is plenty of resolution. But newsletters. presentations, and sales proposals should look as slick as possible. This is especially true when you plan to reproduce them on a copy machine or at the print shop, where some quality invariably gets lost in the process.

Some 300-dpi printers don't handle large type well. Curved edges can print broken and uneven, and charac-

Jaggies result from dots too large to fill in-or smooth outtight areas. The tighter dots of 600-dpi printers smooth out graphics much more effectively than the larger dots produced by 300-dpi printers.

Since laser printers simulate shades of gray by alternating black dots with white areas, 600-dpi printers have a significant advantage over 300-dpi printers. Photographs print more sharply at 600 dpi. You wind up with about four times the number of simulated shades of gray as on a 300dpi machine. Printers with 300dpi resolution are capable of only 25 shades of gray: 600-dpi printers can simulate more than 100 shades of gray.

The 600-dpi printers also print tighter screens, or percentages of black, in device-

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### **Flux 1.1**

Challenge your computer opponent in one of the most addictive games you'll ever play in this new strategy board game for one player. Every time you land beside an enemy piece, it changes to your color and becomes yours. Flux features many unique setups and has three difficulty levels. Flux requires VGA graphics and a mouse. Registration is \$15.

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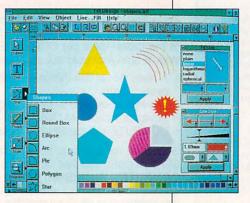
# **ART WORKS**

Robert Bixby

# DEAD REPTILES: SOFTWARE EVOLUTION

Are you as tired of dinosaurs as I am? If not, check out Jurassic ART from Computer Support (15926 Midway Road, Dallas, Texas 75244-9982; 214-661-8960; \$59.95). It's a special packaging of Scenerio (reviewed in an earlier column). Computer Support has always been known for its clip art, and it's brought something new and interesting to the genre—

Low-cost products aren't necessarily lowend. Like PagePlus and GeoWorks, 1st Design provides inexpensive power.



a little flexibility. Jaws and limbs of certain pieces of dinosaur clip art can be ungrouped from the rest of the drawing and rotated to change the pose. Kids will love the drawings you create with Jurassic ART, if dinosaurs haven't gone the way of the pet rock and the Davy Crockett hat by the time you read this.

Lizards have popped up in the chat areas online as well. Among the Rush Limbaugh dittohead clubs and invitations to twisted trysts, Barney (the kidshow dino) is appearing in the names of chat rooms such as Death to Barney.

If you're looking for a GUI with a collection of useful apps like spreadsheet, database, and word processor, GeoWorks Ensemble 2.0 is out—and has been out for

some time now. Unfortunately, the folks at GeoWorks (2150 Shattuck Avenue, Berkeley, California 94704; 510-644-0883; \$79.95) wouldn't let me write about the product until it was on the market.

GeoWrite, the program most directly applicable to this column, has a lot of new desktop publishing capabilities including master pages and frames. You can use all of the fonts you've been using with 1.2. The new GeoWrite automatically converts 1.2 documents to 2.0 format, but although you can export to sev-

eral other formats (not just ASCII), you can't export to a Geo-Write 1.2 format.

GeoDraw is now packed with drawing utilities including curve editing and more import filters. At their most advanced level (all apps in 2.0 feature four lev-

els of operation), each of the major applications incorporates GeoDraw, so you can use all of the drawing tools within GeoDraw and GeoWrite as well as within the spreadsheet and database.

GeoWorks Ensemble 2.0 is a faster, friendlier, larger collection of even more useful utilities and applications than version 1.2. Desktop publishers should consider it among other low-cost desktop publishing options. GeoWorks seems to be more interested in third-party support this time around, having already run a "boot camp" for outside developers.

I might as well admit that I love a bargain. GST, the developer of Timeworks' line of desktop publishing programs, is going to introduce a Windows illustration and design

program called 1st Design at the incredible price of \$49.95.

With 53 TrueType fonts, 1st Design features a simple autotrace, polygons and stars, gradient fills, Bézier curves, blends, and typographical manipulation (like kerning, fitting to path, and spacing) worthy of a product several times its price.

The 1st Design product does lack masking and hole-cutting features, however.

The GST product was released in the U.S. in September, though it's been available in Britain for some time. GST can be reached at Meadow Lane, St. Ives, Huntingdon, Cambridgeshire, England PE17 4LG; 011-44-480-496-789. As of this writing, GST doesn't have a U.S. address.

A second GST program, 1st Press, may also be introduced. It's a frame-based Windows desktop publishing package reminiscent of Ventura Publisher.

There's stiff competition at the low end of the price spectrum from products like PagePlus (Serif, P.O. Box 803, Nashua, New Hampshire; 800-697-3743), which is being compared with high-end desktop publishing programs like QuarkXPress but sells for only \$59.95. A fonts package (with 120 TrueType fonts) and a type manipulation package are available for \$19.95 each.

Have a DTP tip you'd like to share? Let me know about it by calling (900) 884-8681, extension 7010203 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. Or write to "Art Works" in care of this magazine. And if you don't have a tip, please let me know what you're publishing, what software you're using, and how "Art Works" can help.

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# **DISCOVERY CHOICE**

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Clayton Walnum

# WHERE IN SPACE IS CARMEN SANDIEGO?

The world's favorite villain, Carmen Sandiego, sure does get around. She began her illustrious career by hopping across the globe, committing new crimes wherever she set down her jet. Since then, not only has she victimized every corner of the earth, but she has also managed to find her way through time and America's past. Now, in Where in Space Is Carmen Sandiego?, her crime spree leads into the great expanse of the universe, where a gang of dastardly aliens joins her to terrorize the solar system from the sun to lonely, frozen Pluto.

If you're familiar with the other Carmen Sandiego games, you'll be able to slip into this new installment like a pair of favorite slippers. Although your crime stopper vehicle has metamorphosed into the Cosmohopper and the game controls have been rearranged, the basic gameplay is identical to that in the other games in the series.

You begin by getting your assignment from the chief, a bizarre alien who looks like a cross between Jabba the Hut and a parakeet. Because the squeaking and squawking he passes off as language is incomprehensible to human ears, your Cosmohopper's main screen displays the conversation in English. When you get your first assignment, you learn that, as always, Carmen and her gang are snatching valuable artifacts. For example, the chief may tell you that the culprit has stolen the Skynd crater from Ura-



nus's moon Umbriel, the Sacajawea from Venus, or Hermes's winged hat from Mercury.

With your mission recorded, you blast off to the place the Sandiego gang was last seen. To complete your mission, you must search several of 32 locations for 1 of 15 suspects. Locations you'll visit include not only the nine planets but also the sun, asteroids, Halley's comet, and many moons. The 15 aliens that make up your suspect list are as different from each other as a tomato is from an anteater. Sporting such punny names as Astro Fizzix, Avery Littlebit Phelps, and Hanover Fist, these creatures represent some of the strangest life forms ever seen in our solar system.

Besides the villains, you have your on-board computer, VAL 9000, to keep you company. Using VAL, you can access an online database, dossiers on the various criminals, a travel log, and the game options. In addition, VAL sometimes uses her digitized voice to relay such sarcastic comments as "What do

you think the little E stands for on your fuel gauge?" and "A rocket scientist you're not. You've eliminated all suspects."

Upon arrival at your new location, you gather clues by questioning witnesses, tapping into V.I.L.E. radio frequencies, or performing a star search for incoming messages from your colleagues. Witnesses and V.I.L.E. radio transmissions immediately give you clues to your next destination. When performing a star search, however, you must first use the star map to lock onto the constellation from which the transmission was sent. To find the constellation, you use the controls on your Cosmohopper to scroll the star map to the correct longitude and latitude, at which time the selected constellation spins to the right of the screen and displays its associated animated image (for example, a bull for Taurus).

Finding where the culprit has fled is only half of your battle, though. You also need to learn the criminal's identity so you can get a warrant for his or her arrest. To do this, you contact an informant, who tells you about one of the creature's seven characteristics: gender, number of eyes, feature, locomotion, favorite writer, favorite astronomer, and favorite food. You might, for example, discover that the creature has no eyes, loves the writings of H. G. Wells, or snacks on space cadets.

After deciphering the clues, you choose your next destination. To help narrow things down, the Cosmohopper's display offers a menu of four locations, one of which is correct. Clicking on a location sends your Cosmohopper blasting into space. When you arrive, you're shown a digitized NASA photo of the location. If the location you picked is correct, you enjoy a short, animated sequence of a V.I.L.E. henchman's outerspace antics. One animation features a one-celled creature that divides into two and, upon seeing its twin, flees in terror. Another depicts a creature covered with suction cups that gets stuck to your screen. All told, there are about a dozen of these humorous sequences.

After the V.I.L.E. henchman skedaddles, you begin the clue-gathering process again. Eventually, after several jumps to various locations in the solar system, you catch up with the criminal and make your arrest—assuming, of course, that you arrive in time, don't run out of fuel, and have the proper warrant.

One thing that sets Where in Space apart from the other Carmen Sandiego games is its huge online database. Although the game comes with Peterson First Guide to Astronomy, you don't need it to play. All answers to the clues

can be found in the online database, which is accessed through your Cosmohopper's VAL 9000 computer.

The database menu allows you to select any of 18 general topics, including each of the planets; such topics as astronauts, astronomers, and explorations; and a glossary of astronomical terms. When you select a general topic, a list of subheads appears, enabling you to jump to a specific topic of interest with a click of the mouse. To find topics even more quickly, you can enter a word into the text entry area, and the computer will search the database for every occurrence of the word, after which you can browse all the identified entries for the information you need.

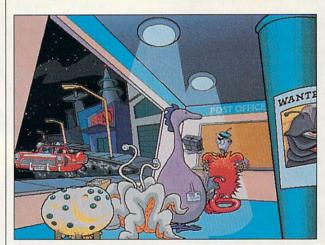
Most entries in the database include digitized graphics. As you browse through the database, you'll come across portraits of astronauts and astronomers, photos of planets and moons, cross sections of celestial bodies, and images of satellites, just to name a few. Animation, too, is used to good effect in the database, from orbiting planets to the birth of the sun to an awe-inspiring flight over the surface of Mars that was constructed from actual photos taken by the Viking.

In short, the astronomy database included with Where in Space is worth, by itself, the price of the entire package. And it's very easy to use; you can access it without having to play the game simply by typing carmen val at the DOS prompt. Even after you've grown tired of the game (if that's possible), the database is sure to continue to fascinate.

If Where in Space has a

weak point, it's the same one found in previous games in the series: There just aren't enough animated sequences. Although the animation adds much to the game at the start, it doesn't take long before the sequences start repeating. You can stop an animation at any time by clicking a mouse button, so you aren't forced to watch them again and again. But the game

IBM PC or compatible (80386 compatible), 640K RAM, VGA, hard drive with 8MB free; mouse recommended, most sound cards supported—\$79.95



would be much improved with enough animated sequences to carry the player through a full game with minimal repetition.

Still, Where in Space Is Carmen Sandiego? is yet another wonderful entry into an already long and successful line of educational computer games. Plus it's a fascinating romp through the solar system featuring awesome digitized photos from NASA's own files and a clever gang of otherworldly characters. You have to wonder, though: Now that Carmen has made it through America, Europe, the world, time, America's past, and space, where can she possibly go next?

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Shay Addams

# SPECTRUMPROSE HOLOMICROBYTE?

When Sierra asked Jim Walls to do another Police Quest, he turned in his badge and did Blue Force for Tsunami instead. The game turned out even better than some of his Police Quest work, and a sequel is underway. Sierra turned to another law enforcement veteran, former Los Angeles police chief Daryl Gates, to codesign Police Quest IV. And it made the latest cop-on-the-beat adventure a cross-media event by bringing in "America's Most Wanted" producer Tammy Dargan to produce the game, which Sierra says creates a "whole new category of gaming: reality role-playing.

In a story set in contemporary Los Angeles, you play detective John Carey, out to find a killer who has "worked the media and public into a frenzy." Nowadays, Sierra is making an effort to differentiate its adventures, and the twist is technological in this latest Police Quest-it marks the first use of Kodak's DCS 200Ci digital camera in creating a computer game. Gates took the design team on location with the camera in downtown L.A. to shoot many of the color background scenes. Due out this month for MS-DOS, the game is also scheduled for CD-ROM and the Mac. (Rumors that the Gates-designed game includes a video camera are unfounded. Or at least there wasn't one in my package.)

In the fantasy realm, Sierra has transformed its TSN (The Sierra Network) multiplayer game Shadow of Yserbius into a single-player quest for PCs. The boxed edition includes a new chapter in the Yserbius saga and other new features. In November, look for Inca 2 and Goblins 3 (both

created by Coktel Vision) and Quest for Glory IV: Shadows of Darkness from Sierra.

New engine, new world. Instead of just bringing out yet another Magic Candle game with a new software engine under the hood, designer Ali Atabek let the Candle series go out with the third installment. Atabek did develop an all-new engine, but he harnessed it to drive a fresh fantasy world and story line for Mindcraft's latest role-playing series, The Griffon Masters. The first installment is already out. And if you miss playing the original Magic Candle games, try The Bloodstone, which employs the same engine.

A first in the realm of "utilitainment" software. Walt Disney licensed some of its characters to Berkeley Systems. which does the After Dark screen saver. The new screen saver features animations from 101 Dalmatians, Beauty and the Beast, Mickey Mouse shorts, and other cartoon clas-Disney reportedly worked closely with Berkeley on the product and plans more such licenses and more coproducing in the future. Already out for the Macintosh. the screen saver should be shipping for Windows by now.

Sequel time. Origin's Wing Commander Academy lets you design new missions and trade them with friends or play new randomly generated missions. It's a stand-alone game, so you don't need the original program. But don't look for another Wing Commander for a while. Wing Commander III isn't slated for release until late 1994. But at least the construction set doesn't signal the end of the series, like it did with SSI's Unlimited Adventures construction set for Gold Box games. Origin is using the Strike Commander technology in upcoming titles such as Privateer, a

trading and combat game which takes place in the depths of outer space, and Pacific Strike, which re-creates World War II dogfight action.

LucasArts' new variety pack, Classic Air Combat Sims, contains Battlehawks 1942. Their Finest Hour, and Secret Weapons of the Luftwaffe, along with all the Tour of Dutv disks. Adjustments were made so the joystick routines and other aspects of the older programs function well on a 486. B-Wing is LucasArts' second mission disk for X-Wing. It introduces a new craft to fly. as well as the fifth Tour of Dutv. Spectrum HoloByte's MiG-29 is the slickest and most substantial mission disk of the year, letting you take the other side in the Falcon 3.0 war.

Will CD-ROM games really sell? LucasArts simultaneously released Day of the Tentacle on floppy and CD-ROM. A major distributor reported the versions selling about equally-a good sign for the newer format. Other new CD-ROMs to look for this fall are Electronic Arts' Labyrinth (originally designed for CDTV) and Brøderbund's The Myst, both CD-ROM-only adventure-style games. Other recent CD-ROM releases worth looking for include I-Motion's Shadow of the Comet (mixing action and adventure) and Alone in the Dark II (adventure in a Gothic horror setting), as well as LucasArts' action-arcade game Rebel Empire (the company's first CD-ROM-only title).

The hot news as this was being written was Spectrum Holo-Byte's acquisition of Micro-Prose, a deal that pumped \$10 million into the latter company. Micro-Prose's balance sheet, it's rumored, was inspiration for the title of Legacy: Realm of Terror, which was released prior to the deal. The plan is for both companies to operate independently.

LucasArts' Day of the Tentacle is selling equally well on CD-ROM and floppy. WING COMMANDER.

# PRIVATEER

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# ENTERTAINMENT CHOICE

Surge into the future, where you fight to regain the throne of the ancient Incan people in this stunning blend of folklore and science fiction.

Scott A. May

# INCA

Adrift in time and space, you awaken to fulfill a destiny written more than 500 years ago: savior to the lost Incan civilization. So begins one of the year's most audacious and original games—an action-adventure born of a rich past, set in the unknown future.

Imported from French software developer Coktel Vision. Inca showcases the rising talent of designer Pierre Gilhodes, who gave Sierra's its Gobliiins distinctive punch. Gilhodes's latest combines many disparate styles and gaming genres, strung together with a thoroughly outof-kilter story line. What in theory should never work unfolds with singular grace and clicks in our imaginations.

To fully appreciate Inca, you must immerse yourself in its unusual background, based equally in fact and fable. The story begins in 1525, as an aging Incan ruler named Huayna Capac foretells the fall of the great Tawantinsuya empire. He predicts floods, earthquakes, and the arrival of "bearded savages"-Spanish marauders lured by tales of "the gilded one," El Dorado. According to legend, El Dorado was an Incan chief who would cover himself in gold dust for ritual celebrations. As a sacrifice to the god of nobility, he'd wash off the gold in the waters of Lake Titicaca. Followers would also toss gold into the lake to appease the sun god.

In 1532, Spanish conquistadors, led by Francisco Pizarro, waged battle on the mighty Incan warriors. Though the Spaniards were outrageously outnumbered, the Incan army, weakened by



years of civil war, was soon defeated. Pizarro's men, however, found little gold. As Capac says, "The real treasure—Inca knowledge—will never be found."

From this beginning, Inca blasts 500 years into the future, aboard the lost city Paititi, which is adrift in space. You're approached by the spirit of Huayna Capac, who welcomes your return as El Dorado. Your mission is to restore brilliance to the Incan sun by recovering the three missing jewels of Time, Matter, and Energy. To succeed, you must win the help of various spiritual protectors and defeat the powers of Aguirre, an evil force symbolic of the greedy, savage conquistadors.

Your journey unfolds along a linear path that's divided into three phases, one per jewel, of increasingly diverse and difficult quests. The game offers a satisfying mix of arcade and mental challenges, ranging from 3-D space combat and first-person shootouts to mind-bending graphic and logic puzzles. You must confront and overcome obstacles in a prescribed order. While unsolved puzzles merely stall

your quest, failed arcade segments result in loss of life. Instead of traditional game saves, randomly generated pass codes allow you to restart the game at various milestones in your journey.

The cursor-driven graphic interface functions in two modes: cockpit and ground views. Behind the controls of your Tumi fighter, the cursor serves as both weapons crosshairs and navigational device. Some of the action you'll encounter includes asteroid belts, Star Wars-style trench combat, and deep-space dogfights. Your toughest (and most unusual) galactic battle kicks off the game's final phase, as you square off against authentic Spanish galleons. These huge, threemasted ships firing cometsized cannonballs are as unsettling as they are deadly.

Ground exploration features a similar windowed display, with a visual inventory and limited online advice from Huayna Capac. Besides fighting, you also pick up and manipulate objects, which are key to solving the game's series of visual puzzles. Correct moves trigger dazzling audio

and visual rewards, enticing you to press on. Other elements of play include multiple 3-D mazes and realtime duels to the death with Aguirre's space-age warriors, fought with plasma bolts instead of swords. These otherwise simple slugfests are heightened considerably with outstanding full-motion digitized video and sizzling sound effects.

The game's graphics are extraordinary—an opinion echoed at the 1992 Paris Supergames Show, where the title won honors for best graphics. Much of the game's visual appeal stems from its superb use of color as well as its sheer variety of graphic styles, from Gouraud-textured 3-D polygons to finely detailed scanned bitmap artwork. Complementing the animated actors is a full range of crisp, digitized speech, much of it delivered in the authentic Quechuan tonque. For those unfamiliar with this arcane culture, the main menu offers an online glossary of terms used throughout the game. Other sampled sound effects include goose bumpinducing footsteps and slamming doors as well as the atmospheric groans and creaks of the wooden galleons rocking in space.

Dynamic on disk, the game is absolutely stunning



CD-ROM version of Inca

on CD-ROM, offering enhanced cinematic segues, full character voices, and stereo soundtrack. Inca's CD-ROM audio is unlike that in any other CD-ROM game on the market. It uses true CD audio, not just the computer's sound card, and the result is absolutely incredible.

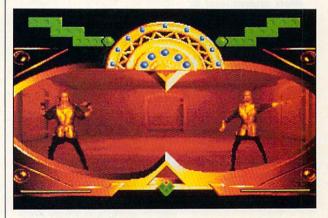
Gilles Douieb supplies 14 pieces—over 40 minutes—of original New Age-style music, performed with authentic Incan woodwinds and percussion. Also included is the song, "Inca People," written and performed by J. M. Marrier. A minor hit on European radio, the song adds flair to the CD-ROM version's extended graphic intro. An audio interface, built into the main menu, allows instant access to any of the CD-ROM's music tracks. There's even an onscreen antara (bamboo panpipe) for those inclined to play along, available in both versions. Overall, Sierra's multimedia treatment transforms an uncommonly good game into a true work of art.

Despite the game's unusually rich graphics and sound, the game makes surprisingly minor hardware demands, running equally well on both lowend (80386/20 minimum) and high-end (80486/66) systems. The biggest price paid is hard drive space, which ranges from 16MB for the disk version to 33MB for the CD-ROM version. One nice touch: Sierra's CD-ROM installation offers four configuration choices, allowing you to transfer 100, 70, 25 or 0 percent of the game to hard disk. Because of the game's segmented story structure and effective memory usage, most users with reasonably fast CD-ROM drives (250- to )

350-ms access time) can get by with minimal hard drive installation.

As with most bright gems, this one has a few minor flaws. One of the most annoying is simply the speed at which onscreen text—usually important clues or dialogue—appears and quickly vanishes. Given the game's eccentric nature and enigmatic prose, this loss of information can easily lead to confusion. The designers should've given players control of text flow

IBM PC or compatible (20-MHz 80386 or faster), 640K RAM, 256-color VGA, hard drive with 18MB free, mouse; joystick optional, supports Sound Blaster, Ad Lib, Thunder Board, Pro



or at least provided a way to pause the display. Also disappointing is the poorly implemented joystick routine, an arcade setback softened only by the game's well-designed mouse controls. Finally, once solved, the game provides little replay value. A possible solution would be to scramble some puzzles or to increase the difficulty level of the arcade sequences.

Inca's surrealistic blend of ancient folklore and science fiction will throw many players off guard. But those looking for a wholly original, multifarious challenge will delight in this fantastic journey of sight, sound, and imagination.

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# **GAMEPLAY**

Paul C. Schuytema

# ROMP ON THE WILD SIDE

First, grind up a portion of Bimthylquinoline crystals; then add just a touch of Metyraphosphate. Dispense as a powder, and presto! Birth control for the radical woman of the 1880s. This and other exciting recipes can be yours to concoct in Freddy Pharkas, Frontier Pharmacist, the latest adventure from the twisted minds of Al Lowe and Josh Mandel.

Freddy Pharkas is the first truly fresh idea for an adventure game that I've seen for quite some time. The game takes place in Coarsegold, California, in 1888—just a few years after the gold rush. Our hero, Freddy, is not a gunslinger (although he once was); he's a pharmacist who also runs a soda fountain on the side.

I spoke with designer Al Lowe about the game, and I was particularly interested in how he came up with the idea of Wild West pharmacology. It seems that the team at Sierra On-Line had already committed to doing a comedy Western game, since it was a hitherto untapped niche in the adventure market. Lowe. along with Mandel (the adventure's producer and writer) and Roberta Williams (of Laura Bow fame) were sitting around, brainstorming, looking for a central character. Lowe somehow got his tongue twisted as he attempted to say "farmer" and "rancher" at the same time, and "pharmacist" came out. Within minutes, the three of them were laughing so hard that they were rolling on the floor. The idea of a frontier pharmacist was one of those ingenious mistakes, and it was perfect.

Freddy is a Dudley Do-Right sort of guy. He has a diploma and is struggling to keep his village from becoming just another ghost town.

A few things really stand out in this adventure. First is the feeling of a true environment: Coarsegold seems to be living and breathing even when Freddy isn't there. The town is a side-scrolling work of art. It was first created as a sixfoot-long painting, and then it was digitized into the computer. (The original is now hanging at the Sierra offices in modern-day Coarsegold.)

Beyond just looking gorgeous, the town is a closed system that allows Freddy to wander, explore, and interact with the characters in a very convincing way.

The game's puzzles are also outstanding. Face it: Any good adventure game is simply a good story braided with a series of player-solvable puzzles. But all too often, the puzzles fit a routine formula or are so obtuse that people in their right minds can't begin to solve them.

In Freddy Pharkas, the puzzles are difficult yet solvable, and there's more player involvement. But what makes them so interesting is that each one is unique and crazy; they really stretched my creative-problem-solving acumen. Freddy must analyze, mix, build, and perform all sorts of gyrations as he moves from puzzle to puzzle, making players work very hard for rewards.

I've deliberately avoided talking about the game as a comedy because, for me, gameplay is the foundation upon which everything else is built. Freddy Pharkas, though, is a comedy, first and foremost. Lowe saw it as an opportunity to pay homage to the rather seedy genre of the Western film, and he took nearly every cliché he could find and warped it to fit this zany world.

Some characters, like Fred-

dy's faithful Indian sidekick, Srini Bagdnish (the animist from India), play with the stereotypes. Other gags pay homage to certain movies; take, for instance, the scene between Srini and Freddy, which is reminiscent of the scene in *Cat Ballou* in which Jane Fonda helps Lee Marvin dress for a gunfight.

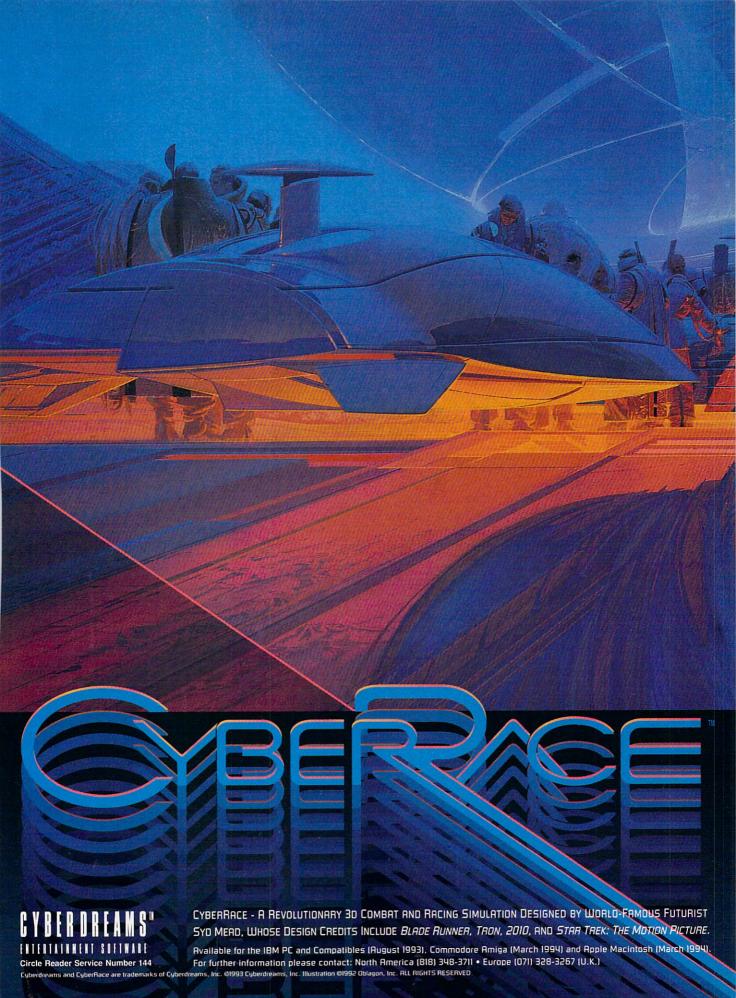
Lowe worked long and hard on the story line for Freddy Pharkas, attempting to create the richest and most believable tale possible for his sense of humor. He even took a workshop in plot and story development from Roger McKee to help with his story. Then he turned to Mandel for his magic pen. Mandel wrote the text of the gags and dialogue, and he created a wonderfully absurd handbook, The Modern-Day Book of Health and Hygiene: 1881 Edition, which comes with the game.

When I asked Lowe what difficulties he encountered when working on Freddy Pharkas, he was silent for a moment. Then he shrugged (over the phone) and said, "Actually, I'm getting pretty good at this." You'll agree with him when you play the game.

He's very appreciative to all those who've helped him create the game, especially Clint Eastwood, whose movie *Unforgiven* is one of Lowe's favorites. And Lowe says that he certainly appreciates Clint's winning an Oscar just to promote Freddy Pharkas.

Freddy Pharkas breaks new ground and refines Lowe's comic storytelling ability. But most important, it's extremely challenging and entertaining. Like any good B Western that comes with a tub of popcorn, Freddy Pharkas, Frontier Pharmacist is well worth the price of admission. Indeed, taking a romp on the range with this Wild West pharmacist is time well spent.

Become a Wild West pharmacist in Al Lowe and Josh Mandel's latest zany world.



# Building a virtual golf course that feels like the real thing is all work—and all play.

n a darkened office, surrounded by The Eagles' Greatest Hits from the CD player, Bruce Carver, president of Access Software, does trees. He spends as much time on trees as he can, without totally ignoring other minor duties such as determining the direction of the company, deciding whether to license its products to Microsoft, and tending to other pesky details. No one digitizes images as well as Bruce Carver. And few probably enjoy it as much, either.

We're thankful for his talent and dedication. The results, seen in Access Software's series of add-on golf courses for the company's line of golf games, are best-selling, ultrarealistic renditions of famous courses around the world. Banff

Springs, a recent release, is on the software bestseller lists at press time. By the time you read this, Tarpon Springs, a Florida course, will probably be the latest success.

Anyone with a PC and an interest in golf-and certainly any faithful COM-PUTE reader-knows about Links 386 Pro and its junior Links partners. and Microsoft Golf (Links for Windows). These games perennially win the Software Publishers' Association's Best of the Year Awards. COMPUTE Choice Awards. and countless other prizes. The games' success lies in the seamless marriage of an unmatched golf game engine with actual golf courses lovingly and meticulously digitized to provide an almost real sense of the

course as you play.

All three games use the same course disks, but the courses are most spectacular in Links 386 Pro's 256color Super VGA mode. That game's basic interface provides all the information you could possibly want, from scrollable, zoomable aerial views and reverse views from the green to an incredible array of statistics on your play. Balls behave precisely as they would on a real course, rolling down hills, bouncing off paved golf cart paths, and careening wildly if you should be unfortunate enough to hit a ball washer. We don't know what happens when you hit an alligator with a hard twoiron shot, but we'll find out as soon as the Tarpon Springs course ships. (The alligator will be on the

course in the exact spot it was the day the design team shot the video used to create the course disks.)

# It's Magic

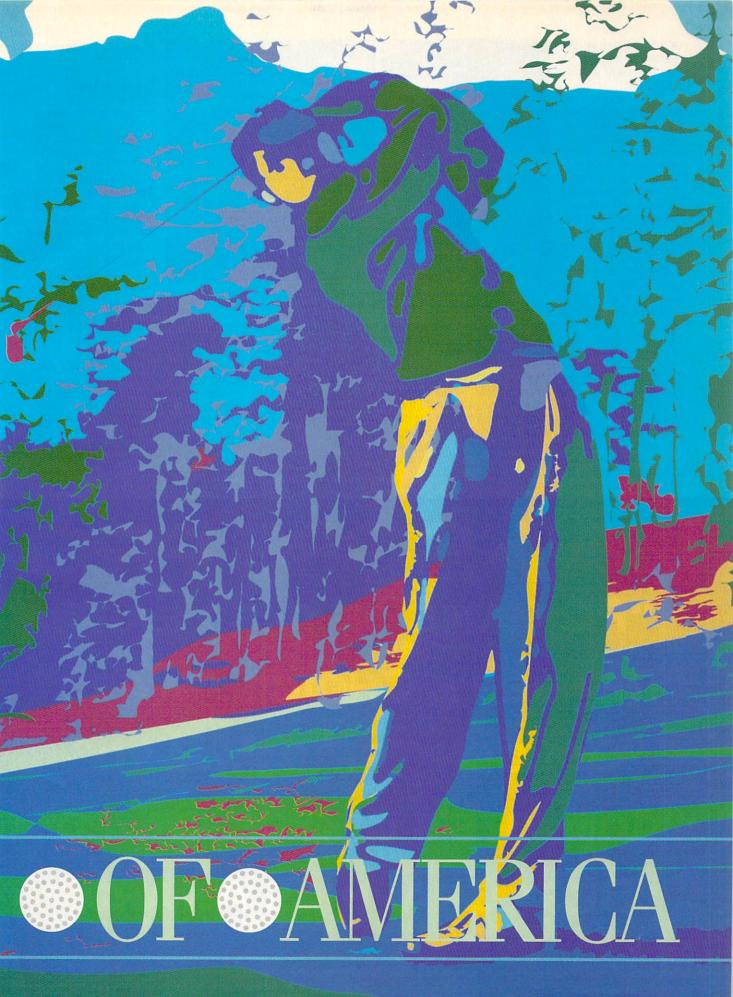
As important as the game's basic play engine is, the golf courses themselves provide ever-fresh excitement to the game. The stunning beauty and realism of these courses never cease to amaze us, even now that we know how they're created. Access routinely receives calls and letters from golfers who have played the actual courses and are astonished at how much the computer version simulates reality.

These courses duplicate the real thing, down to the placement of each tree and bush, ball washer, bench, boulder, and yes, even alligator. These are magical

By Richard O. Mann and Ramona R. Mann

Illustration by Richard Hawks





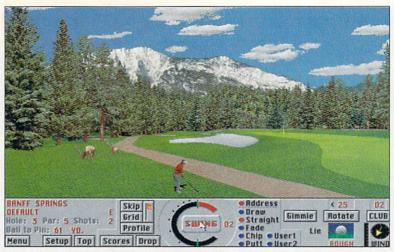
worlds that are so like reality that it's easy for you to totally lose yourself.

What's even more amazing is that Access pumps out these enchant-ing courses every few months. How can Ac-cess produce such realistic courses so quickly? How can it convert miles of verdant terrain into such an accurate computer simulation? We spent a day with the members of the Links design team at Access in Salt Lake City to

find out what sort of magic they use to accomplish these seemingly impossible tasks.

# The Magicians Take the Stage

It all starts with course selection. The folks on the Links course design team are avid golfers who study golfing books and magazines when they're not actually out on the links. They watch for famous courses with outstanding features, such as picturesque settings or particularly inter-



In Banff Springs, where the deer and the antelope play, realism is the effect Access programmers strive for.

esting or challenging hole layouts.

Once the team obtains the rights to use a course, it swings into action. John Berven, who shoulders the overall responsibility for the project, and Zeke McCabe, a professional photographer, travel to the site and play a round to familiarize themselves with the course. If it doesn't rain, the next few days are spent taking videos and still photos of the course. "Golf course managers call us whenever things get too dry—it always rains for four days

when we show up," says Berven.

### The Show Begins

Berven straps on a battery pack and a special video camera and then walks the entire course with the tape running. He walks down the middle of each fairway, pausing frequently to make a 360-degree turn for the tape. He also makes sure he gets a thorough set of shots of any special objects noted during the previous round of golf. Unusual trees or

shrubbery, buildings near the course, animals, boulders, and so forth—all of these need to be specially shot.

Meanwhile, McCabe takes still photos of trees and other objects. Trees, we learned, make or break the visual portrayal of a golf course. McCabe works diligently to identify 50-60 trees that exemplify all the generic trees on the course. He also shoots all the small identifying features of the course, such as the flags on the flagsticks, so that every detail

# LINKS 386 PRO

"PC GAME OF THE YEAR"

—Game Player Magazine

"READER'S CHOICE AWARD"

-- MULTIMEDIA WORLD

"GOLDEN TRIAD AWARD"

—COMPUTER GAME REVIEW

"COMPUTE'S CHOICE AWARD"

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"BEST GRAPHICS AWARD"

---VIDEO GAMES AND COMPUTER ENTERTAINMENT

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will show up in the game.

Finding and shooting all the objects can be a challenge. It was at Tarpon Springs that McCabe decided to photograph a six-foot alligator that was sunning itself just off the fairway. As Berven tells it, McCabe nervously crept closer and closer to the gator, snapping shot after shot. Finally, about ten feet from the gator, he was satisfied that he had enough good shots. He relaxed and turned to walk back to the golf cart. As he did, the gator slipped back into the swamp with a loud smack of its tail on the water. "Zeke jumped ten feet when he heard that. He thought the gator was after him," says Berven, chortling.

The next day, McCabe strapped himself into a rented helicopter so that he could hang out the door and take 35-mm photos with his fast-winding Nikon F-4. The chopper flew down each fairway sideways, with the door McCabe was hanging from tilted to let him shoot the photos directly down, without any obstructions. When developed, these stills were taped together to give a four-foot strip photo of the hole from above.

The pair also obtains a topographical map of the course. If none is readily available, they have professionals create one.

Creating Illusions

Back in Salt Lake City, digitizing begins in earnest. Technicians scan the topographical map into a special course architecture program developed for this purpose. It reads the information into a course database, capturing essential information about every square foot of the course's terrain: elevation, nature (fairway, green, rough, sand), slope, and so forth.

From there the course goes to the smoothers, a half-dozen experts who compare the computer's rendition of the course from the topographical map with the videotape and aerial photos. Using the architecture program, they can do virtually anything to the terrain, from smoothing the curves of the edge of the fairway to creating hills or holes anywhere. Primarily, they convert the somewhat roughly mapped information into smoothly flowing terrain that matches the image on the videotape. Splitting up the course among the staff of smoothers makes it possible for them to finish this painstaking, inch-byinch work in five or six weeks. At the conclusion of smoothing, Berven polishes the transition between holes, making sure everything matches up seamlessly.

The Magic Is in the Art

While the smoothing is in process, some other things are happening. McCabe's shots of trees and objects go to the best Kodak Photo CD lab he can find; there they're converted to CD-based images. With those CDs in hand, Bruce Carver starts his month's work of perfecting each image.

Photos, of course, have an unlimited range of colors. To convert them for SVGA, Carver has to refine each image to a palette of only 256 colors. Building the palette that gives the best results is the key to Carver's arcane art. He is meticulous, working pixel by pixel till the images approach perfection.

Outside the president's office, the word is that courses are often held up for weeks while Carver refines that last pixel. In his office, Carver says with a gentle grin, "I have to hustle to keep from holding things up."

Planting the Illusions

Once Carver is satisfied, the object files go to Berven, who "plants" the trees and other objects. With the object files at the ready, Berven works with his overhead photo strip to precisely place each tree and other object in its proper place on the terrain. He can place a tree within one square foot



SPA AWARD" BEST SPORTS PROGRAM 1993

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of its actual location and plot terrain within two inches of its actual elevation. He places each unusual tree and object in its appropriate square foot, then works with the representative generic trees and shrubs, sizing them according to the videotape's image and planting them where the overhead photos show them.

After completing this process, Berven plays the computer course, comparing each hole to the videotape as he goes. "Even though we've placed each tree, sand trap, and other feature in exactly the right place, sometimes they simply don't feel right. In real life, things occasionally look different than they really are, so we have to tweak things to achieve the real look and feel, even though it results in a tree being slightly out of place or a hill being higher than it really is." he says.

Then the course goes into intensive play testing. Many minor problems show up at this stage, mostly in the smaller details. The team continues to refine the course until Berven is satisfied that the course seems exactly the same as the course he's played and videotaped. Around 2-1/2 months have passed from playing the opening round to sending the product to manufacturing.

The course design and production teams have this process down to a science. They've created a dozen courses so far and routinely produce new ones approximately every two months. As they work, however, they come up with new refinements in the technology. In fact, almost every course has shipped with a new version of the core game program with minor changes, adding features needed for the new course.

A Real Fantasy Course

Perhaps you've seen calendars or posters featuring the most difficult golf holes in the world. One pictures the green on a tiny ledge halfway down the cliff at Niagara Falls; others are similarly outrageous. The Access golf geniuses couldn't resist the challenge to create their own fantasy course.

But Links courses are real, based on actual terrain. They must allow you to actually play the course. For a setting for his make-believe course, Berven went to the U.S. Geological Survey map repository to search for the ideal topography. He selected an area near Kings Peak in the rugged High Uinta mountain range in Utah.

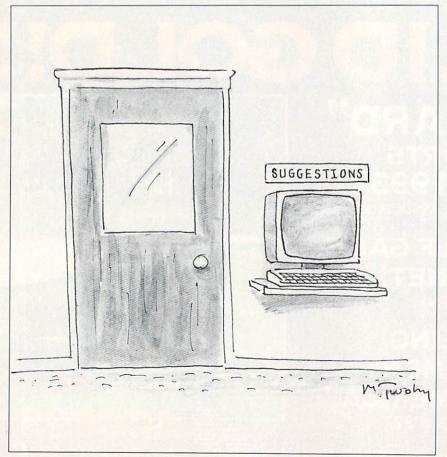
The course is well under way; we saw fairways in the bottoms of canyons, tees on cliffs, and greens a hundred feet above the fairway. This is going to be a wild golf course—but rest assured, it's almost real. If you could get the land rights, you could build this course up there in those rugged mountains.

The fantasy course will be released as part of a promotional tie-in with Access's upcoming state-of-the-art interactive movie game, Under a Killing Moon, a two-CD thriller due in

the first quarter of 1994.

Devotion and Passion Make the Magic

You don't often encounter executives spending their time digitizing trees in darkened rooms. Bruce Carver's passion for his work is evident, as he eagerly explains the intricacies of trees, 256-color palettes, and searching for the best Photo CD lab. Here is a man who pushes the limits of technology and human effort in order to achieve the highest quality possible. The result is a seamless, magical illusion which so closely simulates reality that you have to remind yourself you're sitting in a chair at your house and not in some faraway place chipping away out on the links.



# SPEAK UP!

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# 64/128 VIEW

Here are a couple of new products from two companies that still have faith in the Commodore market.

Tom Netsel

eter Fiset, the man behind Performance Peripherals, makes a number of great products for the 64 and 128. Check out any CMD advertisement and you're sure to notice RAMLink and RAMDrive, just two of his creations.

GEOS and REU users are probably familiar with two of Fiset's other Commodore peripherals: BBGRAM and BBU. BBGRAM is a battery-backed RAM for GEOS 2.0 that is a fast alternative to mechanical drives. BBU is a battery backup cartridge for the 64 or 128 that provides permanent memory (nonvolatile) for Commodore RAM expansion units.

Many companies have dropped Commodore products from their inventory, but Fiset keeps making new ones. Continuing with his alphabetical names, Fiset now offers BBRTC, a new and novel realtime clock.

While he doesn't say so. I assume BBRTC means battery-backed realtime clock. In any event, this module plugs into the unused joystick port for non-GEOS appli-Software cations. comes with the module executes automatically whenever GEOS is booted. This sets the GEOS time and date. Users can program BBRTC to any date and time, and leap years are calculated automatically.

BBRTC works with or without an REU, and it can be used with GEOS 1.3 and up, including GEOS 128 2.0. It comes with a number of utilities that are written in BASIC. BBRTC sells for \$19.95 plus \$3.00 shipping and handling to U.S. destinations. \$4.00 for those in Cana-

da, and \$6.00 elsewhere. For more information or to order, contact Performance Peripherals, 5 Upper Loudon Road, Loudonville, New York 12211; (518) 436-0485. To place an order from the U.S., call (800) 925-9774.

In other news, Mad Man Software has started to ship its Compression Kit. This is a disk and file backup system that features fast data compression for the 64.

According to Gene Barker, the Mad Man himself, Compression Kit works with all Commodore computers and drives. Designed for the 64, the kit works with both North American NTSC and European PAL versions. It's also configured to work with JiffyDOS, all of the CMD hard drives and floppy drives. RAMLink. RAMDrive. This menu-driven utility lets you copy, move, and delete standard files, as well as copy and compress partitions and entire disks.

For a number of years, Mad Man has been working on its multidisk adventure game, Messiah III. Compression Kit grew out of the company's need to provide a reliable backup and verify utility that worked with all of the staff computers and drives. As it turned out, this utility worked so well that Barker decided to market it. Compression Kit sounds like a great utility for power users or sysops who run a multidrive BBS.

Compression Kit retails for \$39.95. It can be ordered from Mad Man Software, 1400 East College Drive, Cheyenne, Wyoming 82007 or by calling (800) 34-MADMAN. For more information call (307) 632-1178.

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The Sound Interface device has three voices that enable your 64 or 128 to play music, initate musical instruments, talk, and make sounds. Here's how to tap into that power.

# THE SOUNDS OF

f you've used your 64 for any length of time, you probably know what great sound capabilities it has. Each 64 has three voices, or tone oscillators, and each of these voices has four waveforms: triangle, sawtooth, pulse, and noise. All three voices must share the same volume control, but each voice can produce sound independently of the others. The Sound Interface Device, an integrated circuit chip known as SID, resides inside both the 64 and 128 computers. It has the ability to let your computer play music, imitate musical instruments, talk, and make any number of sounds to accompany games. To produce a single sound on the SID chip, it's necessary to issue a few commands in a precise order. SID occupies memory registers 54272 through 54300 in the 64. To produce sounds, we poke different values to

several of these registers. Here's a review of the order in which you must issue commands to cause SID to produce a sound.

- 1. Clear the chip
- 2. Turn up the volume
- 3. Wait
- 4. Set a frequency
- 5. Set an envelope
- 6. Turn on a waveform

Of course, this procedure plays only a single note on one SID voice. By changing frequencies, you can play a simple melody. Many songs for the 64, however, include a melody, a harmonic line, and some percussion. This requires that all three SID voices be programmed more or less independently. Beautifully elaborate songs are usually programmed in machine

**By Larry Cotton** 

language, but simpler tunes can easily be programmed in BASIC. Before we go any further, however, we must understand the concept of bit manipulation.

**Bit Manipulation** 

The 64 and 128 are both 8-bit computers. That means that each of their myriad of memory registers holds one byte, or eight individually controllable bits. When you turn on or turn off a voice, you're actually gating and degating a memory register. To gate a voicecontrol memory register, you simply change one bit-the first one-in that register. See figure 1 for a representation of one particular register, 54276, which is the control register for voice 1.

In figure 1, the rightmost bit-bit 0-must be set, or changed, from a 0 to a 1 to make the voice speak. Do this by poking a 1 to the memory register 54276.

However, in addition to setting the 0 bit, you must

also select one of the four waveforms. This requires setting another bit to 1. As you can see in figure 1, each of the four leftmost bits (4 through 7) represents a waveform.

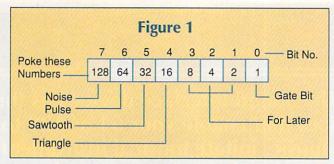
To select a waveform, pulse, for example, you set bit 6 to a 1. Bit 6 is controlled by poking a 64. Add 1 to gate the register and then poke the result to that register. Thus, a poke of 65 to 54276 turns on voice 1's pulse waveform. Poke 33 to turn on or gate the sawtooth waveform, 17 to turn on the triangle waveform, and 129 to turn on noise.

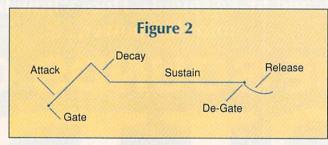
The pulse wave is unique. To hear it, you must poke some value to at least one of its two pulse-width registers. For each voice, there are coarse and fine pulse-width registers.

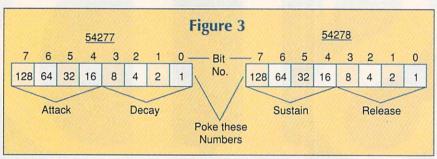
For now, we'll just poke 8 to the coarse pulse-width registers 54279 and 54286 for voices 1 and 2, respectively. The other waveforms don't need this poke.

OK, the voice is on. There are several ways to make the voice shut up. The easiest way is to make bit 0 a 0 again. We've seen that if waveform 65 gates the register to make it play, poking a 64 degates or turns it off. Likewise, poking a 129 turns on the noise waveform, while 128 turns it off.

There are at least three other ways to







silence a voice. You can change the voice's envelope to a shorter sustain and/or decay value; you can poke a 0 to the voice's frequency registers; or you can poke a 0 to 54296, the master volume control.

Here's a snippet of a program featuring two sustained voices,

SET UP PULSE WAVE AS SQ UARE WAVE VOICES 1 AND 2

REQ VOICE 3 (DRUM) -- FINE FREQ. NOT NECESSARY

D FREQUENCIES FOR VOICE

S 1 (A1, A2) AND 2 (B1,

HA 90 POKES+15,50: REM COARSE F

FP 100 READAl, A2, B1, B2: REM REA

B2)

GK 110 IFA1=0THENEND

accompanied by percussion, that demonstrates some of the techniques just described. Take a look at the Three Voices listing and follow the line-by-line explanation that follows.

Line 10 defines S as the first of SID's 29 memory registers. It then clears the chip by poking all the registers with 0. Lines 20 and 30 turn up the volume and initiate a short pause.

In lines 40 and 50, attack and decay for voice 3 (the drum) are set differently from attack and decay for voices 1 and 2 (melody and harmony). Likewise, sustain and release are set differently in lines 60 and 70. Line 80 sets up the pulse wave width

> for the first two voices.

> We read data for the melodic frequencies in line 100, while the drum's frequency remains constant at 50 (line 90). In lines 110 and 120, we poke both fine and coarse fre-

quencies to the register.

Now let's use bit manipulation to turn on voices 1 and 2 with a pulse wave. We set bits 6 and 1 by poking a 65 (64 + 1) to 54276 (S+4) and 54283 (S+11) in line 130. While the notes play, a FOR-NEXT loop in lines 140-180 plays four drumbeats. Line

# Three Voices

SE 120 POKES+1,Al:POKES+8,Bl:R EM COARSE FREQUENCIES V S=54272:FORJ=STOS+24:POK ED 10 EJ, G: NEXT: REM CLEAR SID (SPACE) CHIP OICES 1 AND 2 XD 130 POKES, A2: POKES+7, B2: REM FINE FREQUENCIES VOICE POKES+24,15: REM VOLUME A DP 20 LL 3 VOICES S 1 AND 2 FORT=1T0500:NEXT:REM WAI PH 140 POKES+4,65: POKES+11,65: REM TURN ON VOICES 1 AN POKES+5,12:POKES+12,12:R D 2 (PULSE WAVE) EM ATTACK AND DECAY VOIC BG 150 FORZ=1TO4: REM NO. OF DR ES 1 AND 2 UM BEATS FA 50 POKES+19,2:REM AD DRUM EQ 160 POKES+18,129: REM TURN O BM 60 POKES+6,4:POKES+13,4:REM N VOICE 3 (DRUM) SUSTAIN AND RELEASE VOI

CG 170 FORT=1TO200:NEXT:REM LE CES 1 AND 2 POKES+20,15:REM SR DRUM NGTH OF DRUM BEAT XK 70 HS 180 POKES+18,128: REM TURN O QS 80 POKES+3,8:POKES+10,8:REM

FF VOICE 3 GR 190 NEXT

POKES+4,64: POKES+11,64: FD 200 REM TURN OFF VOICES 1 A ND 2

MD 210 GOTO90 DATA16,195,21,31,15,210 XD 220 ,25,30,14,24,16,195,0,0 ,0,0

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| Figure 4                          |                                  |  |  |  |
|-----------------------------------|----------------------------------|--|--|--|
| Attack                            | Decay                            |  |  |  |
| 0 (no bits) shortest              | 0 (no bits) shortest             |  |  |  |
| 16 (bit 4)                        | 1 (bit 0)                        |  |  |  |
| 32 (bit 5)                        | 2 (bit 1)                        |  |  |  |
| 48 (bits 4 and 5)                 | 3 (bits 0 and 1)                 |  |  |  |
| 64 (bit 6)                        | 4 (bit 2)                        |  |  |  |
| 80 (bits 4 and 6)                 | 5 (bits 0 and 2)                 |  |  |  |
| 96 (bits 5 and 6)                 | 6 (bits 1 and 2)                 |  |  |  |
| 112 (bits 4, 5, and 6)            | 7 (bits 0, 1, and 2)             |  |  |  |
| 128 (bit 7)                       | 8 (bit 3)                        |  |  |  |
| 144 (bits 4 and 7)                | 9 (bits 0 and 3)                 |  |  |  |
| 160 (bits 5 and 7)                | 10 (bits 1 and 3)                |  |  |  |
| 176 (bits 4, 5, and 7)            | 11 (bits 0, 1, and 3)            |  |  |  |
| 192 (bits 6 and 7)                | 12 (bits 2 and 3)                |  |  |  |
| 208 (bits 4, 6, and 7)            | 13 (bits 0, 2, and 3)            |  |  |  |
| 224 (bits 5, 6, and 7)            | 14 (bits 1, 2, and 3)            |  |  |  |
| 240 (bits 4, 5, 6, and 7) longest | 15 (bits 0, 1, 2, and 3) longest |  |  |  |
|                                   |                                  |  |  |  |

150 turns on the noise waveform—the drumbeat—by poking a 129 (128 + 1) to voice 3's control register; line 170 degates it. Line 180 ends the drumbeat's FOR-NEXT loop.

Line 190 degates voices 1 and 2 by resetting bit 0 to 0, and then line 200 sends control back to read more note frequencies.

# More on Envelopes

A note's envelope can be described as the way its volume changes while it plays. Figure 2 shows how a typical envelope could look.

The rate of rise in volume at the left of the curve is called the attack, which starts as soon as the voice is gated. This volume usually rises to a relatively high level and then drops back. This part of the sound's lifetime, called decay, is the rate that the volume of the sound diminishes from this highest level to the sustained level. Sustain is the flat portion of the sound curve.

Finally comes the release portion. Release starts when the voice control register is degated and is the rightmost portion of the curve.

Timing also influences the representative shape of an envelope. Remember, we used FOR-NEXT loops to create pauses while the notes and drumbeats sounded.

Each voice uses two memory registers to control its envelope, which is often referred to as the ADSR envelope. The first register controls attack and decay, and the second controls sustain and release.

How do you know what to poke into the envelope registers? I've found that the most effective way to set up an envelope is by trial and error, listening to the sound. However, it helps to know how the envelope is affected by the setting of each bit. Figure 3 represents the memory registers for attack and decay (54277) and sustain and G-6 COMPUTE NOVEMBER 1993

release (54278) for voice 1.

Figure 4 is a chart which can help you decide what to poke to the attack/decay register. The upper four bits, 4-7, control attack, while the lower four, 0-3, control decay. Attack can be gradually lengthened by poking the values shown in increments of Poking 240 sets all four bits, 4–7, for the longest attack time.

Changing decay gradually, however, is a bit easier. Just poke 1-15 for increasingly longer decay times. Sustain and release are controlled in register 54278 for voice 1. Bits 4-7 control sustain, while 0-3 control release.

Of the four parts of an envelope, sustain is the only one that is a volume level, as opposed to a rate of volume change. Therefore, you must set a sustain level before the release can be heard.

Enough theory. Check out the short program called Envelopes that should end your quest for the perfect envelope. As you hear the sounds, watch the values change to show what to poke where to achieve that sound. This is for voice 1 only. For voice 2, add 7 to the memory registers; for voice 3, add 14. As mentioned, voice 1 occupies registers 54272-54278, voice 2 occupies 54279-54285, and voice 3 resides in 54286-54292.

# **Envelopes**

| AM  | 10   | PRINTCHR\$(147)  | PR  | 220 | IFA\$=F3\$THEND=D+1:IFD>1                    |
|-----|------|--|-----|-----|--|
|     |      | POKE650,128: REM REPEAT A  |     |     | 5THEND=15                                    |
|     |      | NY KEY   | CR  | 230 | IFAS=F4STHEND=D-1:IFD<0                      |
| RR  | 30   | F1\$=CHR\$(133):F2\$=CHR\$(1   |     |     | THEND=0                                      |
|     |      | 37):F3\$=CHR\$(134):F4\$=CH  | JB  | 240 | IFA\$=F5\$THENS=S+1:IFS>1                    |
|     |      | R\$(138)   |     |     | 5THENS=15                                    |
| CG  | 40   | F5\$=CHR\$(135):F6\$=CHR\$(1   | AF  | 250 | IFAS=F6\$THENS=S-1:IFS<Ø                     |
|     |      | 39):F7\$=CHR\$(136):F8\$=CH  |     |     | THENS=Ø                                      |
|     |      | R\$(140)   | MC  | 260 | IFAS=F7\$THENR=R+1:IFR>1                     |
| EF  |      | SID=54272:FORJ=SIDTOSID+   |     |     | 5THENR=15                                    |
|     |      | 23: POKEJ, Ø: NEXT: REM CLEA   | HA  | 270 | IFAS=F8\$THENR=R-1:IFR<0                     |
|     |      | R SID  |     |     | THENR=0                                      |
| KA  | 60   | POKESID+24,15:REM FULL V   | MK  | 280 | PRINT" (DOWN) ATTACK                         |
|     |      | OLUME  |     |     | {4 SPACES}DECAY                              |
| SG  | 70   | V1=6:V=2 V1+1:REM INITIA   |     |     | [5 SPACES] SUSTAIN                           |
|     |      | L VOICE  | 120 |     | {3 SPACES}RELEASE                            |
|     |      | D=5:REM INTIAL DECAY   | RS  | 290 | PRINT" (DOWN) "A*16"                         |
|     |      | P=30:REM INITIAL PITCH   |     |     | {LEFT} {UP}",                                |
| EK  | 100  | POKESID+3,8:REM PULSE W  | BK  | 300 | PRINT" (DOWN) "D" (LEFT)                     |
|     |      | IDTH   | -   | 210 | {UP}",                                       |
| HQ  | 110  | PRINT" (HOME) (DOWN) P =   | 50  | 310 | PRINT" (DOWN) "S*16"                         |
| 194 | 400  | {SPACE}RANDOM PITCH  | On  | 220 | {LEFT} {UP}",                                |
|     |      | PRINT" V = CHANGE VOICE  |     |     | PRINT"{DOWN}"R"{LEFT}"                       |
|     |      | PRINT" ANY KEY = REPEAT  | EG  | 330 | PRINT" (DOWN) POKE 54277                     |
| PD  | 140  | PRINT" SPACE BAR = BEGI  | **  | 210 | ,"A*16+D"{LEFT} "<br>PRINT"{DOWN} POKE 54278 |
| *** | 1.00 | N RELEASE  | AA  | 340 |  |
| KB  | 150  | PRINT" (DOWN) ATTACK TIM   | BC  | 250 | ,"S*16+R"{LEFT} " POKESID+5,A*16+D:REM AT    |
|     |      | E = {3 SPACES}F1/F2":PRI<br>NT" DECAY TIME   | ьс  | 330 | TACK/DECAY                                   |
|     |      | {2 SPACES}={3 SPACES}F3  | XD  | 360 | POKESID+6,S*16+R:REM SU                      |
|     |      | /F4"   | AD  | 300 | STAIN/RELEASE                                |
| DF  | 160  | PRINT" SUSTAIN LEVEL =   | 22  | 270 | POKESID+4,V-1:REM SILEN                      |
|     | 100  | {SPACE}F5/F6":PRINT" RE  | AA  | 310 | CE SOUND                                     |
|     |      | LEASE TIME = {2 SPACES}F   | CF  | 200 | IFAS="P"THENP=INT (40*RN                     |
|     |      | 7/F8   | GE  | 300 | D(1))+5:REM RANDOM COAR                      |
| BB  | 170  | GETAS: IFAS=""THEN170  |     |     | SE PITCH                                     |
| FX  | 180  | IFA\$=CHR\$(32)THENPOKESI  | OB  | 390 | PRINT" (DOWN) POKE 54273                     |
|     |      | D+4,V-1:GOTO110:REM SIL  | QD. | 330 | ,"P"{LEFT} "                                 |
|     |      | ENCE SOUND   | PD  | 400 | POKESID+1, P: REM COARSE                     |
| BE  | 190  | IFAS="V"THENV1=V1+1:IFV  |     | 100 | {SPACE}PITCH                                 |
|     |      | 1=8THENV1=4  | XD  | 410 | V=2†V1+1:POKESID+4,V:RE                      |
| GK  | 200  | IFAS=F1STHENA=A+1:IFA>1  |     |     | M BEGIN SOUND                                |
|     |      | 5THENA=15  | хн  | 420 | PRINT" (DOWN) POKE 54276                     |
| EM  | 210  | IFAS=F2STHENA=A-1:IFA<0  |     |     | ,"V"{LEFT} "                                 |
| 179 | 1/// | THENA=0  | xo  | 430 | GOTO11Ø                                      |
|     |      | De la companya de la |     |     |  |
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# **FD-SERIES DRIVE**

It sits there, kind of dark and mysterious, atop my stack of innocent-looking Commodore disk drives. There's no other drive like an FD drive—

not for the Commodore, surely, or even for my fancy PC in the other room. Combined with Creative Micro Designs' exquisite operating system, JiffyDOS, the FD delivers an unprecedented level of power and performance for your 64 or 128.

The most obvious feature of the FD is its storage capacity. There are two models from which to choose. The FD-2000 offers 1.6MB of storage on a high-density disk and 800K on a standard 3½-inch floppy. The FD-4000 offers the same as the FD-2000, but it'll let you store 3.2MB on an extended density disk. Both drives include a utilities disk and come with JiffyDOS.

That's a lot of room, even for GEOS power users like me, who accumulate fonts and clip art like dust balls under the bed. No matter what you spend your computer time doing, from games to telecommunicating to desktop publishing, you'll find plenty of space to do it on the FD.

Without a way to organize and operate that space, however, it'd be close to useless. That's where JiffyDOS comes in. CMD's experience with its hard drives and RAMLink comes shining through with the FD. It knows, for example, that many Commodore programs require a drive which is 100-percent compatible with the 1541.

CMD also knows that Commodore's built-in DOS, designed to fit the cozy world of 51/4-inch disks, would be helpless in the wide-open

spaces of a high-density 3½-incher. JiffyDOS, on the other hand, has grown with the technology, from starting out as a system for making your Commodore drives a little smarter and a whole lot easier to use to managing hard drives and multiple megs of RAM with the finesse of a seasoned pro.

The key to handling space for JiffyDOS is partitioning, breaking up the megabytes into smaller sections. The FD drive, like other CMD power peripherals, comes with a disk of utilities to make this a snap.

You don't have to split things up if you don't want to. If you want the thrill of seeing 12,736 blocks free when you list your directory, you can create one big native mode partition.

But, as I said, a lot of programs get ornery if they don't find everything laid out exactly like a 1541. Drop one of these programs into a native mode partition, and it would lock up faster than the local bank at five o'clock. On top of that, it's just plain easier to find your way around in smaller spaces, where you don't wait for a directory listing to scroll by like a freight train at rush hour. This is where smaller partitions, either native mode or those emulating standard drives, are perfect.

You can, for example, create a 1581-size partition of 3200 blocks for downloading files from QuantumLink. You might create another 1581-size partition to run GEOS under the deskTop, since the deskTop can only recognize a partition that acts like a regular drive. You can also create a partition that emulates a 1541 or 1571, right down to the track and sector layout—but you'll notice that it's certain-

ly faster than a 1541 drive.

The FD also beats the 1581 hands down, as I learned from a friend who borrowed the FD to run his BBS for a few days. He usually uses four 1581 drives. Even running simply as a 1581, reading a standard 1581-format disk, the FD easily outpaces the other drives on his system running identical tasks. Then, after configuring the drive as a large native partition, he let the FD take over his upload/download chores. When he realized just how much space that gave him, he suggested that I leave the unit with him for a few more months.

Speed isn't the only plus you get from the FD. The SWAP command, which RAMLink and RAMDrive also have, makes the FD even more compatible. You can, for example, use the FD as a data drive for some programs and even for downloading from QuantumLink by swapping the unit to drive 8. You can also let the FD play RAMLink, giving you a variety of areas for various tasks. The FD will let you switch configurations by popping in a different disk, something you can't do on a RAM device without reformatting the whole thing. This makes the FD drive wonderfully flexible. When you add an actual RAM device into the mix, the possibilities are almost endless!

If you use GEOS, the FD drive will be especially exciting. To be able to fully access its various partition possibilities, you'll want to buy a copy of Gateway. Even with the deskTop, you'll have a fast 1581 at your disposal, which means 3200 blocks to pack full of GEOS files. But once you let Gateway take over, you'll be sailing along at warp speed. You

can work with large native mode partitions that you can further divide into subdirectories. You can even switch between partition types, although you can't copy between them directly.

Both geoShell and Dual-Top will also let you access native mode partitions, but only geoShell in its current version will also let you access subdirectories. In my opinion, a large partition organized into subdirectories is the best possible storage arrangement for GEOS, whether on a disk, in RAM, or both.

The utilities disk that comes with the FD drive includes copy programs to transfer files or whole disks to FD disks and partitions. It also includes FD Tools, which takes care of most disk chores, including formatting and creating various configurations of partitions. You don't actually need to use these programs, of course. If you're the kind of user who likes to tinker, you'll find that CMD has once again provided all the documentation you could ask for. JiffyDOS commands, along with BASIC 2.0 and 7.0 commands, are presented with plenty of examples. There's also lots of technical information to let you really put the FD to work. The drive itself hooks up to your system just like any other disk drive, directly to your computer or daisychained to any other drives.

But, remember, this is not just another drive. It's special; it's an FD drive. STEVE VANDER ARK

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# REVIEWS

# SIMPLE SOUND

Interested in programming sound on your SID sound chip? I attempt programming only rarely—then mostly in an effort to understand how things work. When I do look into something technical, I want to be given just the information I need. Too much becomes overwhelming. Simple Sound, from Andor House, provides the right amount of information in small digestible chunks to familiarize you with the nearly infinite capabilities of the famous Commodore SID chip.

Sound is a desirable element in a program. It adds punch and pizazz—and it can be useful as a reminder or cue to respond. The sound capabilities of

the 64 are too important for a programmer to ignore, and Simple Sound makes the introduction painless. Welcome to kindergarten.

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The program begins by supplying documentation on disk, ready to be printed. After a brief introduction of what is available in the program, print out the main article that guides you through the sound tutorial. The program points out right away that it's taking you only through programming voice 1 in BASIC. The SID chip has three voices, but for an introduction to sound, voice 1 is all you really need.

You are shown how to clear the SID chip and how to program it by poking values into it. You are then referred to one of several other programs on the disk called Print Hi/Lo Frequency. Loading and listing this program to the screen gives you the high and low frequencies for musical notes in a chart of eight octaves listing the notes and their frequencies. Run the program to get a printout on paper.

Next, the program describes the sound envelope, which is the shape of the sound-how it begins, holds, and fades away. At this point, you are referred to another program on disk called ASDR Graph. This program displays a typical sound envelope and its ASDR settings. This is all explained in another article.

Finally, you are introduced to waveforms. This topic is illustrated by its own program and graph.

The main article fills four pages printed at 40-column width. As the article takes you through each step, it lists a sample program so you can see how it works. This program can then be loaded and run to hear the sound that it creates. You can then list it to study the example in more detail.

This sample fits on one screen for convenience and contains remarks to explain what each line does. You can then experiment by changing values. This gives you a good idea of what programming sound is like.

The disk also carries some sound effects programs for you to experiment with. All of these samples are written with remarks and suggestions for changes that you might want to make.

Another program, Notecracker, provides a quick way to see what small changes can do to sound by allowing you to enter values for each element you've learned about in the lessons. You then get to hear your sounds.

Words that come to mind when I use this program are considerate, convenient, and clear. Simple Sound puts programming the SID chip within reach of the novice. The author, Don Radler, shows consideration in the small size and simple nature of the sample programs that he builds with you. There's convenience in that the program is self-contained with its concise documentation, onscreen illustrations, and examples.

Finally, the clarity of the explanations is the program's greatest asset. It makes it downright easy to program voice 1. After going through the tutorial a few times, going on to master voices 2 and 3 no longer seems intimidating. You'll feel more comfortable working with sound after you've established a good foundation with Simple Sound. **ROBIN MINNICK** 

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# FEEDBACK

# Where's the Software?

Is the 64 starting to die? I sure hope it isn't. Unfortunately, it seems to me that there are fewer and fewer places selling 64 software these days. There are only two stores in the city of San Antonio that still sell 64 products. Are major companies still producing products for us? If so, who are they? And where can I get GEOS for the 64?

DOUG DENNY SAN ANTONIO, TX

Where to find
Commodore
software, how to
clean your
keyboard, and a
source for
Okimate printer paper

In business terms, the 64 is considered to be a mature market. That's a polite term for one that isn't growing. The computer has been around for more than a decade, and almost everybody who wants a 64 already has one. Also. those users have already purchased most of the software that they want, too. Before they dropped the Commodore line, software developers saw sales of their products plummet. New titles just didn't sell, and merchants can't devote shelf space to items that the public doesn't buy. Unfortunately, a large number of people who once used Commodores have moved on to other platforms. and that's where the action is

There is still a good solid core of dedicated Commodore users, but it doesn't have the numbers it once did. All of this means that whenever a new product for the 64 comes out, instead of 100,000 copies being sold, the number has dropped to 1000—or less. Major companies with large overheads can't make a profit on sales of that size.

If you look through the advertisements in Gazette, you'll see new products for sale, but in most cases, the firms offering them are small. In many ways, the market is

back to where it was in the early days. A lone programmer gets an idea, writes the code, and then sells the program by mail from his or her house or post office box. Only now, the number of buyers is no longer growing.

There are still a few major distributors for Commodore products. Two of the largest are Software Support International (800) 356-1179 and Tenex (800) 776-6781. Call for a catalog. Moving up in the number of 64/128 products handled is Creative Micro Designs. This firm distributes a good number of Commodore items, both hardware and software. CMD is also the place to buy any GEOS products. Call (800) 638-3263 to order or to request a catalog.

Last December, Gazette published a list of large and small companies that still handle Commodore products. An updated version of that list is in the works. The best way to keep the 64 alive is to support those companies that support the 64.

**Keyboard Cleaning** 

I have to press some of the keys on my 64 quite firmly before they register. I think the contacts must be dirty. I've read the procedure for dismantling a keyboard and cleaning it, but now that I need the instructions, I can't find them. Can you help?

JIM GORDON BLOOMINGTON, IN

Keyboard problems can often be traced to dirty contacts. Some keys may stick slightly, resulting in their printing twice. Cleaning usually takes care of these problems. It's not too difficult, but it does require some care. Before you tackle the job, have on hand some isopropyl alcohol, a soldering iron, and a couple of Phillips screwdrivers. Turn over your 64 and remove the three screws. This will let you remove the top of the case. Be careful with the plastic tabs that act as hinges. Unplug the wires that are connected to the red pilot light. A plug pulls out from the socket; you don't have to unsolder them.

Turn the top of the case down, exposing the bottom of the keyboard. You'll see a number of small Phillips-head screws holding on the keyboard bottom. Remove these screws and put them in a safe place. Then, unsolder the two bare wires that connect beneath the Shift Lock key. Do not unsolder any of the colored wires.

Remove the bottom cover of the keyboard, and you'll see a large circuit board on the other side. This is where the contacts are for the keys. If you see any obvious dirt or foreign material, be sure to remove it. Then dampen a clean cloth with the alcohol and rub it gently over the entire circuit board. Pay close attention to clean the square circuit areas.

Reach under the keyboard and press each key. A bar under each key that makes the actual contact will come up out of a hole. Clean each of these bars as well.

Allow the board to dry thoroughly and then resolder the two wires and reassemble the keyboard. It should work good as new.

Okimate Paper

I run three businesses from my home: a mobile DJ service, a radio/TV production facility, and a message-on-hold service. I do it all on a 128 with GEOS. I have two 1571 drives and a 2MB BBG from PPII that I manage with CMD's Gateway.

alternate among three different printers, depending on the job I am doing. I use a Star NX-1000C for everyday printing; a Brother HR-25 daisywheel for letter quality business correspondence; and an Okimate-10 for banners, posters, and other graphics.

The Okimate (thermal transfer and no ribbon, remember?) works great with the high-quality fax paper that's available in most office supply stores. A guy in a print shop recently asked if the flier I'd printed on the Oki was printed on a laser printer.

Thanks for all your support over the years, and I guess I'll keep banging away on this old thing until the keys fall off.
PRESTON THOMPSON
FREDERICKSBURG. VA

Thanks for the tip, Preston. I'm sure many readers will appreciate this new source of paper for their Okimate printers.

#### Renumber

I am writing my first decentsized BASIC program for the 64. Through an interface on my user port, it will operate the solenoids of a game. To proceed, I need two things.

First, I need a program that will renumber the lines of my program. It must allow me to select the starting line number and the interval.

Second, I am trying to locate a book called *Commodore Interfacing Blue Book*. The publisher is Microsignal Press, but it is out of business. Can anyone help me locate this book?

F. KOSTER 171A LONG HILL DR. YORKTOWN HEIGHTS, NY 10598

Perhaps one of our readers can help you locate the book you want, but we have a renumbering utility that works with the press of a function key. Gazette published Renumber 64 by Hubert Cross in the November 1987 is ue.

This short machine language utility does what you want, and it also renumbers references made in GOTOs, GOSUBs, ON-GOTOs, and ON-GOSUBs.

A few copies of this issue are still available. The U.S. price for the magazine is \$6 and \$3 for the companion disk. These prices are valid for any issue prior to October 1990. You can order by writing to COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

Good luck with your game. Let us know how the project turns out.

#### Disk Finder

I am writing a program that I want to be as user friendly as possible. I think I have covered all the possible problems that I can think of but one. Is there a routine that I can use to tell whether or not there's a disk in the user's 1541 drive?

RICHARD BLAKE ALTON, IN

Trying to anticipate every error that a user might make can mean a lot of code for your program, but it's a good idea. Here's a short routine that might do the trick.

It's a good idea to check first to make sure that the drive is turned on. That's handled in lines 1000–1040. Then try to initialize the disk and read the Error channel. We do that in lines 1050–1100.

This routine could be inserted at the start of your program if you omitted the RETURN command in line 1110 and appended the rest of your code from there.

1000 OPEN 15,8,15: CLOSE 15 1010 IF ST = 0 THEN 50 1020 PRINT" TURN ON YOUR DRIVE AND PRESS A KEY" 1030 GET A\$: IFA\$ = ""THEN 1030 1040 GOTO 1000 1050 OPEN 15,8,15,"I" 1060 INPUT#15,E: CLOSE15 1070 IF E = 0 THEN 1110 1080 PRINT "INSERT A DISK IN YOUR DRIVE AND PRESS ANY KEY" 1090 GET A\$: IFA\$ = ""THEN 1090 1100 GOTO 1050

#### Software Wanted

I've looked all over for software for the 64 and I've found a lot of good word processors, but there's one program that I can't find. I'd like to have a program that checks my grammar after I've written something. Has anyone written such a program or seen such a program for the 64?

MIGAILL RICE

Has Gazette ever published a hurricane tracking map? If not, I'm sure those of us who live along the Atlantic coast would like to have one. I'd like to see a program that would present a map of the Atlantic coastline. Gulf of Mexico, and Caribbean. Each day you could enter a hurricane's latitude and longitude, and the program would plot the points on the map. As the plots were updated, you could see the path of the storm and have some idea of where it might strike next.

LOU ROSEN CORAL GABLES, FL

If any programmers have written programs similar to these, we'd be interested in publishing them.

Do you have a question or comment? Write to Gazette Feedback, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

A renumbering utility for programmers, a way to determine whether or not a disk is in a drive, and reader requests for programs

## PD PICKS

Steve Vander Ark

#### **ZIX AND STONES**

OK, enough serious stuff for a while. It's time for another shot of adrenaline-pumping. toe-curling action games. I've played through a bunch of great public domain and shareware games to bring you a couple of the best programs for the 64 and 128. It's a tough job, but someone has to do it.

Before we charge headlong into the latest batch of the deadliest games around, let me run something else by you. A popular telecommunications service of interest to Commodore users is GEnie. The Commodore libraries on GEnie are quite extensive. If you happen to know the file number of the program you want, all you need to do is request a download and feed in that number. That's the fastest way to download a specific program, and since you're paying by the minute, fast means you save money.

Just because I'm such a nice guy, I'll include the GEnie file number of each PD program that I mention in this column. If I find that the file isn't available on GEnie, I'll upload it there. How's that for service?

This month's first game, Super Rockfall, is another masterpiece from Mark Dickenson. The other is Zix, an outstanding version of the old Breakout game. Both of these great programs will get your blood pumping and your joystick jumping.

Super Rockfall by Mark Dickenson. Q-Link filenames: SUPROCKFALL1.SDA (190 blocks) and SUPROCK-FALL2.SDA (28 blocks). Both files are required and were uploaded by Mark AD E. GEnie file number is 8916.

This outstanding 64 program is reputed to be the best game on Q-Link. That's a matter of taste, but from a reviewer's point of view, considering

programming pizazz, user friendliness, game mechanics, and playability, Super Rockfall wins hands down.

Yes, it's a fabulous game, a remake of the venerable Dig Dug arcade game. There's more strategy per screen in Rockfall than you can imagine. And there's plenty of chance to abuse your joystick as you try to tumble little boulders into the right places and try not to start an avalanche. All this action should certainly put Super Rockfall into anybody's Top Ten, but there's a lot more. For example, there's a screen editor to let you create your own fiendish challenges to foist on your friends.

A lot of delighted Rockfall fans have done just that, and you'll find a host of player-created levels on Q-Link. Mark Dickenson also added a very nice music player to the game, which, coming from the author of StereoSIDPlayer, is not surprising. When you download the game, it comes with a nice selection of SID music files to brighten your day. You can even set the game to recognize an extra SID sound chip if you have one.

The documentation is another strong point. The simple fact that it has documentation sets it above a great many games you'll find on Q-Link or GEnie. Mark gives you not only documentation but also a slick little viewer that lets you read it onscreen.

Zix by Pierre Messier. Q-Link filename: ZIX2 (21 blocks). Uploaded by Harold W1. GEnie file number: 6647.

One nice feature on Q-Link is that users can post notes about files in the libraries. When you want to find a good program to download, you can browse through these comments and find out if there is a problem with a program or if other users have liked it. I use these notes a lot as I dig for treasures in the Q-Link libraries, and when I started reading the comments on Zix, I realized that I had hit pay dirt. Someone even said that Zix was probably the best game on Q-Link after Super Rockfall. That got my attention.

The first thing I noticed about Zix was how short it is. A short program is often short on graphics or sound effects. In this case, though, short simply means tight, efficient programming in machine code, which results in an addicting and exciting game.

The inspiration for this game, as I mentioned, is Breakout. I always loved that game, especially the fancier versions that included falling power pills and weird but wonderful brick layouts. Zix incorporates all these goodies, including the best one of all, the one that lets your paddle fire little bombs at the bricks. I don't know about you, but I love a game that lets you blast things into pixel dust with an endless supply of missiles.

There are actually two versions of this game on Q-Link. This one is the updated version which has a few minor bugs fixed and also includes paddle-speed control. The graphics and brick designs are the same in each, as are the various power pills. There is no documentation available. so you'll have to use trial and error to figure out what each pill does. There is also no way for you to know that pressing a number from 1 to 9 before you start playing adjusts the paddle speed or that you can cheat and get 99 lives by pressing Control-P, but, hey, now I've told you!

Each of these great games is a shining example of Commodore programming at its best. You will seldom find programs this exciting-at least not until you see what I've four d for next month!

Here are a couple of outstanding games that will make your list of Top Ten favorites.

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## **BEGINNER BASIC**

Larry Cotton

#### WHERE'S THE DATA? PART 3

Last month, we wrote a short program to save a to-do list to a floppy disk. If you dutifully followed along, your list is now embedded as magnetic particles on a piece of Mylar, awaiting retrieval. Here's a short program to retrieve your list from the disk to your television or monitor screen. The items pop onto your screen as they're pulled from disk.

148 PRINTCHR\$(147) 149 DIMI\$(100) After vou've 150 INPUT"[DOWN] NAME OF LIST TO LOAD";L\$: IFL\$="" THEN END file on disk. 160 OPEN1.8.0.L\$ 170 INPUT#1.X 180 PRINT program to 190 FORT=1TOX: INPUT#1.I\$(T): PRINTIS(T): NEXT 200 CLOSE1: END

> Line 149 dimensions your item array (allots memory space for the list) to the same maximum size as when it was saved. Line 150 uses the IN-PUT statement to get the name of your list. Be sure to load the list using exactly the same name you used when you saved it.

> Line 160 is this month's critical syntax line. The 1 after OPEN is the file number—the same number you gave the file last month. The 8 means vou're communicating with the disk drive. The 0 between the second and third commas tells the disk drive to load (as opposed to save) a file. L\$ is the name of the file that was input in line 150.

> INPUT# in line 170 is the command to pull the data from the disk. It's the opposite of PRINT#, which you used last month to save the data on the disk.

> The first thing we must get from the disk is the number of

items that are on your to-do list. That quantity was sent to the disk last month as the variable X. You don't have to use X again per se, but you must use a similar variable type. X\$ won't work.

Once we have the quantity X, we can begin pulling each item from the disk, one by one, using a FOR-NEXT loop, the upper limit of which is X. Line 190 does the job. It uses INPUT# to load the array I\$(T), then prints each item as it's retrieved. After the items have been loaded from the disk and printed onscreen. the file is closed in line 200.

Let's merge this and last month's programs. We can then make a couple of modifications to add a simple menu. Follow these steps.

- 1. Type in this month's program and save it to disk in case you make an error.
- 2. Clear the screen.
- 3. List the program at the top of the screen, but don't run it.
- 4. While this month's program is showing, type under it LOAD"FILENAME", 8, where FILENAME is the name of the save-to-disk program we wrote last month.
- 5. Last month's program is now in the computer's memory, and this month's program is showing on your screen. Don't clear the screen.
- 6. Move your cursor to the top of the screen and begin pressing the Return key on each of this month's program lines. When finished, the programs will be meraed.
- 7. Clear the screen and list the program to confirm that you have lines 10 through 200.
- 8. Add these lines.

35 PRINT"[CLR][DOWN] DO YOU WANT TO SAVE OR" 36 PRINT"[DOWN] LOAD A LIST (S/L)?" 37 GETAS: IFAS <>"S" THEN

#### IFA\$ <>"L" THEN37 38 IFA\$ ="L" THEN150

9. Add END at the end of line 140. It should read as follows.

#### 140 CLOSE1: END

- 10. Remove lines 148 and 149.
- 11. Save the merged program with a new filename, such as TODOLIST.

Lines 35-38 add a simple two-choice menu. Save includes typing, saving, and printing the list on your TV or monitor screen. Load loads the list and prints it onscreen. Feel free to elaborate on and refine this menu to your liking. With a little creativity and some skillful programming, you can add features such as deleting or changing an item, prioritizing the list, or printing out a hard copy.

Here's the entire listing with checksums for The Automatic Proofreader to help you avoid typing errors.

AM 10 PRINTCHRS (147) GQ 20 DIMI\$(100):PRINT" NO MOR E THAN 100 ITEMS!":PRINT
"{DOWN} PRESS ANY KEY TO
BEGIN." GR 30 GETAS: IFAS=""THEN30 GR 30 GETAS: IFAS="THEN30"

HP 35 PRINT"(CLR)(DOWN) DO YOU

WANT TO SAVE OR"

CE 36 PRINT"(DOWN) LOAD A LIST (S/L)?"

GD 37 GETAS: IFAS<>"S"THENIFAS< >"L"THEN37

HK 38 IFA\$="L"THEN150 BQ 40 PRINTCHR\$(147) CQ 50 X=X+1:INPUT" TO DO";I\$(X

PF 60 IFIS(X) = ""THENX=X-1:GOTO

80 BF 70 GOTO40 FM 80 PRINT

KK 90 FORT=1TOX: PRINTIS (T) : NEX GC 100 INPUT" [DOWN] NAME OF LIS T TO SAVE"; LS: IFL\$ = ""TH

ENEND PA 110 OPEN1,8,1,L\$ QA 120 PRINT#1,X FR 130 FORT=1TOX:PRINT#1,IS(T)

:NEXT

QJ 140 CLOSE1:END QM 150 INPUT"{DOWN}NAME OF LIS T TO LOAD";LS:IFLS=""TH ENEND

PF 160 OPEN1,8,0,LS PG 170 INPUT#1,X

QD 180 PRINT 190 FORT=lTOX:INPUT#1,I\$(T) MO :PRINTIS (T) : NEXT SH 200 CLOSE1 

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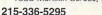
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# MACHINE LANGUAGE

Jim Butterfield

#### **SQUIGGLE ARRAY**

The earliest Commodore computer, PET 2001, was shipped with a tiny program called Squiggle. Squiggle, written in BASIC, draws a wandering line around the screen. We can rewrite this program in machine language and learn a little about arrays as we do so.

Depending on whether it is going up, down, left, or right, the line is drawn with character 221 or 192, a vertical or horizontal bar. You'll find these on the keyboard as the shifted and \* keys. When the line randomly changes direction, one of the corner graphics, such as Commodore-A, is used to make a continuous line.

We use a table to decide which graphics character to print. The following 4 × 4 tables (one in decimal and the other in hex) map the previous or old direction against the new direction of the squiggle.

| New | v (decir | nal) |       | Old   |
|-----|----------|------|-------|-------|
| Up  | Down     | Left | Right |       |
| 222 | 0        | 176  | 174   | Up    |
| 0   | 221      | 173  | 189   | Down  |
| 189 | 174      | 192  | 0     | Left  |
| 173 | 176      | 0    | 192   | Right |
| New | (hex)    |      |       | Old   |
| Up  | Down     | Left | Right |       |
| DD  | 00       | B0   | AE    | Up    |
| 00  | D0       | AD   | BD    | Down  |
| BD  | AE       | CO   | 00    | Left  |
| AD  | В0       | 00   | CO    | Right |
|     |          |      |       |       |

Here's how to read the above table or two-dimensional array. If we're going up and want to continue to go up, we should print character 222. We can't go directly from up to down. The 0 signals an illegal direction change. If we're going up and want to go left, we must print character 176, that code for the Commodore-A key combination.

Our table has four rows and four columns, each numbered 0–3. The previous direction

sets the row number. Multiply it by 4 and add the new direction (column), and you've reached the right spot in the table. We can multiply by 4 with two left-shift commands; it's handy to have a power-of-2 column count.

Two more things help make the job easy. First, each table entry fits within a single byte. And since the whole table fits within 256 bytes, we can reach any entry with simple indexing, rather than having to use indirect addressing.

After we print the selected character, we must move the cursor in the appropriate direction. Which way? The program reads a one-dimensional array (a list or vector) that looks up the cursor movements associated with certain character codes: cursor up, down, left, and right for characters 145, 17, 157, and 29, respectively.

We'll get pseudorandom numbers by reading consecutive bytes of ROM. Let's track the program flow. Detailed code is not given here; for a closer look, run the program and disassemble the machine language code.

The program is poked into memory starting at hexadecimal \$2000, decimal 8192. The table is located at \$2073. You can see it in BASIC lines 190 to 220. Behind it is the list of cursor movements, which will be placed at \$2083.

Clear the screen and move the cursor into the screen area. Set random number tracking to ROM address \$C000. Set the initial direction to up, code 0. Store this at address \$2200.

At \$2021, the program is ready to start work on our fake random value. A value from 0–3 sets our new random direction. Each ROM location can give us four such values, two bits at a time. We extract the byte from ROM, store it away at address \$2201, and hack

off two bits. This give us the random value for the new direction, which we store at address \$2202.

The old direction is stored at \$2200; the new at \$2202. Time to look up our  $4 \times 4$  table to get the printable character. A 0 would signal an illegal direction.

Multiply previous direction by 4 (two ASL commands). Add the new direction; in this case, a logical OR will do the job just as well. The result, transferred to the X register, gives the offset from the start of the table at \$2073. Simple indexing will grab the character we need.

2033 LDA \$2200 2036 ASL A 2037 ASL A 2038 ORA \$2202 203B TAX 203C LDA \$2073,X 203F BNE \$2049

If the character from the table is a value other than 0, we leap ahead and print it. Remember, 0 signals an illegal direction, meaning the line wants to double back upon itself. In this case, we'll just tell it to continue in the direction that it was traveling, or in computer language, set the new direction to equal the previous direction.

2041 LDA \$2200 2044 STA \$2202 2047 BPL \$2033

Note that the above BPL always branches. Can you see why?

At \$2049, the character is printed, followed by a cursor left. We go to our second array to send the cursor in the right direction. Incidentally, we also set the previous-direction value to the new-direction value.

The Run/Stop key is checked at 205D. A little work to set

up the next fake random value, and we loop back.

The program ends when we scan past the end of ROM or when the Run/Stop key is pressed.

Squiggle runs on virtually all Commodore 8-bit machines but doesn't behave quite the same on each. The 128, for example, cheerfully opens up space on the screen when the line runs off the right-hand side. Of course, the ROMs are different in each computer, too.

You'll quickly discover that ROM reading isn't the finest way to generate random values. Many 0 values produce lots of Up commands, and the line will often bump uselessly against the top of the

screen. You'll see distinctive movement patterns as the program scans through repetitive parts of ROM.

Machine language Squiggle runs several hundred times faster than its BASIC forebear. Sixteen thousand moves will take place in less than a minute. That's too fast for easy viewing, so you might like to try your hand at slowing it down so that you can see the line moving. Another possible project would be to add code to keep the wiggling line from trying to run offscreen.

Here's the BASIC listing for Squiggle to get you started. Once the program pokes the machine language code into place, Squiggle takes off.

| PD | 100 |                         |
|----|-----|-------------------------|
|    |     | ,162,10,169,17,32,210,2 |
|    |     | 55,169,29               |
| XA | 110 | DATA 32,210,255,202,16, |
|    |     | 243,169,0,133,253,169,1 |
|    |     | 92,133,254              |
| KF | 120 | DATA 162,0,142,0,34,160 |
|    |     | ,0,177,253,141,1,34     |
| MM | 130 | DATA 78,1,34,78,1,34,41 |
|    |     | ,3,141,2,34,173,0,34    |
| BB | 140 | DATA 10,10,13,2,34,170, |
|    |     | 189,115,32,208,8,173,0, |
|    |     | 34                      |
| GS | 150 | DATA 141,2,34,16,234,32 |
|    |     | ,210,255,169,157,32,210 |
|    |     | ,255                    |
| XP | 160 | DATA 174,2,34,142,0,34, |
|    |     | 189,131,32,32,210,255   |
| RR | 170 | DATA 32,225,255,240,16, |
|    |     | 173,1,34,200,192,4      |
| CE | 180 | DATA 144,190,230,253,20 |
|    |     | 8,2,230,254,208,175,96  |
| AE | 190 | DATA 221,0,176,174      |
| GK | 200 | DATA 0,221,173,189      |
| HM | 210 | DATA 189,174,192,0      |
| EM | 220 | DATA 173,176,0,192      |
| GC | 230 | DATA 145,17,29,157      |
| BE | 280 | PRINT "SQUIGGLE!"       |
| QJ | 300 | FOR J=8192 TO 8326      |
| DS | 310 | READ X:T=T+X            |
| DD | 320 | POKE J,X                |
| PP | 330 | NEXT J                  |
| FM | 340 | IF T<>15825 THEN STOP_  |
| MP | 400 | SYS 8192                |

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NOVEMBER 1993 COMPUTE

# PROGRAMMER'S PAGE

Randy Thompson

#### **INTERFACE AGONY AND ECSTASY**

This month I'm reprinting a letter sent in by Jack Blewitt of Rockford, Illinois, that should interest anyone who has ever struggled with Commodore printers and interfaces. I've edited it slightly for size.

"The May 1993 issue of Gazette's 'Feedback' column helped a reader with a printer underlining problem. As comprehensive as the answer was, it did not mention one of the prime reasons many printer problems occur: peculiarities of specific printer interfaces. Even if you don't have one of these interfaces, you should be aware of the problems they may cause just in case you ever decide to write a program for others to use.

"The Cardco-B, Cardco+G, Super-G, and Gee-Whiz interfaces were designed to emulate both Commodore- and Epson-compatible modes. In these emulation modes, the interface translates many special printer commands before passing them along to the printer. Some printer commands are ignored when the interface doesn't understand them. Because you may want to use a printer feature that the interface doesn't directly support, you can use the OPEN command's secondary address (SA) to tell the printer interface to pass printer commands through unaltered. Even when the interface's DIP switches are set to transparent mode, certain SA values allow you to override that setting.

"For example, to ensure that your printer commands reach the printer, you should use an SA of 0, 1, 7, or 8 when you want to send Commodorespecific printing commands such as Reverse, Expanded, 7-pin graphics, and so on. If

you want to use Epson-specific printer commands for such things as underlining or 9-pin graphics, send them through a printer channel that was opened with an SA of either 4 or 5 (depending on your desired line spacing). Remember, there is no reason you can't have more than one printer channel open at the same time-each with its own unique SA value—so printer commands can be mixed if necessary.

"If your word processor doesn't allow you to change the SA to access your printer, as with The Write Stuff, you might consider locking your interface into transparent mode before loading the program. With the Cardco and PPI interfaces, you do this by adding a 20 to the SA value. For example, by executing the following command prior to running your word processor, you lock the interface in Epson mode.

#### OPEN 4.4.25: PRINT#4, "EPSON MODE LOCKED": CLOSE 4

"Please note that many printers, such as Legend and Siekosha printers, use the SA for their own special purposes. Since it is impossible for programmers to test their code on every type of printer/ interface, you must patiently experiment with SA values.

'Another handy tip to remember is to use the CHR\$() function instead of the actual letter designates when sending printer commands. If your interface's ASCII translation is turned on, an uppercase E might be converted to lowercase, thus changing your printer command to something that might not work. By sending commands such as the following, you should have much greater success with printer codes.

PRINT#4, CHR\$(27); CHR\$(69):

#### REM CHR\$(69) equals E

"Each interface has its own special set of printer codes and so do most printers. Check your manual anytime a program doesn't produce the results you anticipate. Be particularly careful when preparing to print graphics. A Star NX-1000 printer is not the same as an NX-1000C (C for Commodore version), and so on. Even with the same printheads, it is not possible to activate the 9-pin graphics on a Commodore version of the same printer.

"If you want your graphics to print on a computer with the Hot-Shot+ interface, never use the <ESC><"\*"> Select Graphics Mode commands. Hot-Shot+ works all right at 80DPI, but it balks if you attempt to print at 120DPI in this mode. This is probably why so many Hot-Shot+ owners went bananas trying to make Paperclip Publisher print. Hot-Shot+ uses <"\*"> as a proprietary command and will not pass it to the printer. Using the interface's K, L, Y, and Z equivalents works with all interfaces to change graphics density and prevents the above catastrophe.

"It is the responsibility of Commodore users to read and understand the features of their equipment. There are just too many hardware configurations out there for programmers to meet the needs of everyone. If you find that you need specific help, check with your local Commodore user's group to see if an expert there is using the same printer and/or printer interface you are. And while you're getting help, be sure to share your own discoveries. Good Commodore support is getting hard to find.'

If you have a good printer tip, send it to Gazette. We'll share it with our readers.

If you've ever struggled with **Commodore printers** and interfaces. here's some good advice sent in by a reader.



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#### A GEOS USER'S **GUIDE TO GENIE**

If you've read my columns, you know that I'm excited about QuantumLink. I spend quite a lot of time there, poking around the libraries for files to download or chatting with other users over a game of bingo. As I've said before, if you're a Commodore user, you should be on Q-Link. There will never be another service like Q-Link with so much to offer 64 users.

But Q-Link isn't the only game in town. One of the more popular online services these days is GEnie. GEnie supports any type of computer, from the Apple II to mainframes, by sending and receiving ASCII text rather than graphics.

GEnie has a special area devoted to our machines that's called the 64/128 Flagship. It's run by John Brown, the fellow behind Parsec and Twin Cities 128 Magazine. In the Flagship, John maintains message, libraries, and so on.

The resident GEOS expert is a programmer and writer named Robert Knop; his name online is R.KNOP1. He visits the Flagship regularly, making sure GEOS users get the help and information that they need.

One way GEOS users can

get all this help and information is by visiting the bulletin board area. There is a whole category devoted to GEOS messages. Subject areas include converter programs, mega fonts, font editors, geoPublish, gateWay, and geo-Programming in geoBASIC or geoProgrammer. You can read the messages, add your own responses, or ask questions of your own.

You can meet other people in the evenings in the Real-Time Conference area. Here you chat live with other Commodore users from around the country. You can often find John Brown himself, under the name C128-JBEE. Look for Doug Cotton from Creative Micro Designs, too.

There are no officially scheduled GEOS chat times, nor is there a separate GEOS chat area as there is on Q-Link. Rob Knop, however, hosts the conference area on Thursday nights. That's a great time to get GEOS information.

Of course, one of the more popular areas in the Flagship is the file library, which is full of great Commodore programs just waiting to be downloaded. There are 47 different libraries, each containing programs devoted to a particular aspect of Commodore computing. You can find terminal programs in library 6, for example, or 128 graphics in library 28. There are games galore. lots of SID music files, graphics, and utilities for anything you can imagine. Every week or so, John posts a list of the best from the latest crop of files. This makes your hunt for the latest and best programs a little quicker and easier.

As you might guess, there are several libraries for GEOS files. Library 35 is GEOS applications and utilities, number 36 is for GEOS graphics, and number 37 is for GEOS fonts. Kent Smotherman, Irv Cobb. and other crack GEOS programmers regularly upload their programs here.

Some of the more recent uploads in the applications library include an 80-column version of the popular geoWrite utility Toolkit and a disk directory printer which makes listings just the right size for 1581 disks. There's also a blank keyboard overlay done in geo-Paint that you can customize for your own needs. Another user who is handy with his Handyscanner has been uploading scanned photographs to the graphics library.

Over in the font library you'll find some very useful fonts, good for sensible word processing. There are also a few crazier ones such as Mega Valdez, which looks like it's dripping oil.

If you're interested in coming aboard the Flagship on GEnie, be prepared to spend a little money, especially at first. It can be more than a little confusing as you try to figure your way through the extensive menu system. You'll be paying by the hour while you wander around, so plan on a few large bills while you learn the ropes. The best way to learn anything is by doing it, and GEnie is no exception. Before long you'll be sailing through the menus like an expert. Believe me, gaining access to this source of help, information, and programs is well worth the cost.

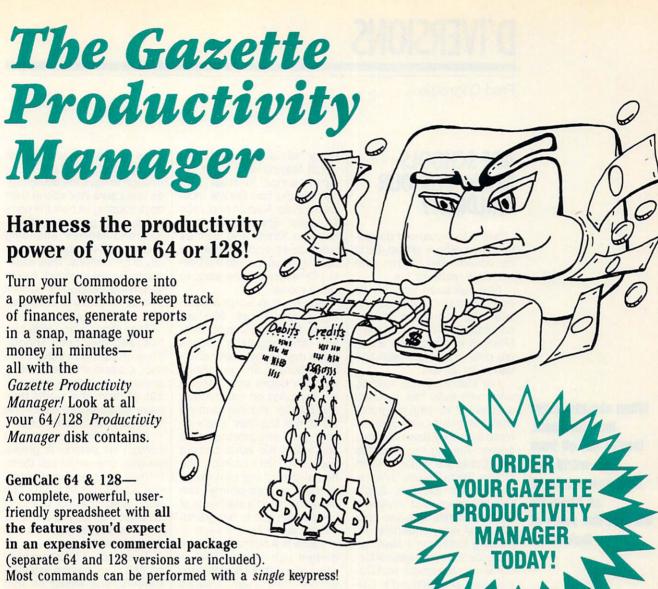
Here's how you can sign on to GEnie:

- Set your terminal software for half duplex (local echo) at 300, 1200, or 2400 bps.
- In the U.S. dial (800) 638-8369; in Canada dial (800) 387-8330.
- Upon connection, type HHH.
- At the U#= prompt, type XTX99018.COMMRT and then press Return.
- · Have a major credit card or your checking account information handy.

When you sign on with the COMMRT password, that puts you on the Commodore users' mailing list, and it gives the Flagship credit for signing up a new user.

Once you're aboard, be sure to drop me a note. My screen name is S.VANDER-ARK. I'm always happy to answer questions and listen to comments!

**GEnie** is an online service that has a lot to offer Commodore and GEOS users.



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## **D'IVERSIONS**

Fred D'Ignazio

# ARE SCHOOLS READY FOR OUR CHILDREN?

I have a four-year-old daughter, Laura, who is almost ready for school—but I'm not sure school is ready for her.

She has been working on computers since she was one year old, and she is now an accomplished "mouseketeer." She can find and click a single pixel on a high-resolution

computer screen.

Her introduction to reading and math skills has included a variety of learning programs that resemble videogames more than they resemble textbooks. Among her favorites are Edmark's Millie's Math House, Sierra On-Line's Alphabet Blocks, EA\*Kids' Eagle Eve Mysteries, and Voyager's AmandaStories. She also uses CD-ROM encyclopedias, including Compton's Multimedia Encyclopedia; National Geographic's Mammals; and Discis' and Brøderbund's CD-ROM storybooks such as Scary Poems for Rotten Kids, Just Grandma and Me, and Arthur's Teacher Trouble.

Laura is comfortable with computers, but she's not a toddler nerd. In fact, she spends only a few minutes a day at the computer. Like any four year old, most of her "work" takes her outdoors and into the company of other people.

She spends a couple of mornings a week at day care. She attends toddler play gym at the YMCA, and she goes to dance class and art class. In the summer, she attends various camps, including swim camp and dinosaur camp.

Like other kids of her generation, Laura is a born button pusher. She has her own little Strawberry Shortcake boom box and her own Fisher-Price cassette player to play a li-

brary of audio cassettes which feature Raffi "save the earth" songs, lullabies, and soundtracks from favorite movies such as *Aladdin* and *Little Mermaid*. She has her own Sesame Street and Barney videotapes and confidently pops a videotape into the family VCR whenever she wants to see a movie.

She is just as adept at other family appliances. She answers the cordless telephone. and she regularly leaves voice mail on her parents' office phones. She publishes her own books by enlarging her drawings on her daddy's photocopier and then stapling the pages together. She's also a good little photographer and works the video camera like a pro. On occasion she has also sent her own faxes. Using a picture phone, she has transmitted a still image of her devilish grin to her grandmother in the Florida kevs.

Laura is a normal kid in the gadget-rich 1990s. That is why I worry about her going to school next year. Laura's world is saturated with little electronic gadgets, but school is gadget-deprived.

As a kindergartener Laura will be lucky if she has occasional access to a computer. She will have little chance to see movies, listen to tapes, or receive or make phone calls. If she does see a computer or other device, it will probably be in a tightly supervised situation in which she is told to perform narrowly defined tasks.

This would contrast sharply to her prior experiences in which she has had the time and trust to explore the computer or any other machine. At school things are certain to be quite different.

Some schools are now experimenting with what they call IEPs, Individualized Education Plans. But this is precisely what preschool kids experi-

ence before they ever reach school. Kids who are lucky enough to have the advantages that Laura has spend their days trooping all over the community with parents, babysitters, and nannies, attending courses at a variety of community organizations. They experience a well-rounded, highly satisfying version of school that takes place entirely outside of school walls.

Then these same kids turn five, and they enter school. They cross the threshold into the classroom, and they spend several hours each day cut off from the world they have explored so freely the first five years of their lives.

At home, if Laura wanted to contact her parents or grand-parents, she would call them. If there were an emergency, she would dial 911. She has been taught that four years old is not too young to take charge of her life and to "reach out and touch someone."

At school, if Laura wanted to contact her parents or grand-parents, she would be told this was improper. She would learn the value of patience. And isolation. And powerlessness. She would learn that five years old is not nearly as old as she had believed.

And what about children less advantaged than Laura? They never have the opportunity to experience the richness of the world—either personally or electronically—and never have the opportunity to make decisions on their own. Then they turn five and go directly from their disadvantaged world into a disadvantaged school.

(Next month, we'll look into new educational strategies which turn Laura's classroom into an open system—a classroom without walls—where children are able to practice skills and use tools they will need in tomorrow's world.)

When children enter
the classroom,
they're cut off from
the world that
they have explored
so freely for
the first five years of
their lives.

#### **SUPER SCREEN FONTS**

By Rick Kane

Have you ever noticed how nice text looks on a PC clone with an EGA display? The characters are clear and crisp, and they're also smoother and fuller than the Commodore character set. This is because the PC clone characters have twice the vertical resolution! It takes 16 bytes to define one of these characters instead of the 8 bytes per character we're used to looking at. Seems kind of unfair, doesn't it?

Well, we don't have to put up with it anymore. While it isn't generally known, the Commodore 128 is capable of using the same 8- × 16-pixel character sets as those high-priced PCs. Actually, a 128 can use up to 32 scan lines per character, but I'm getting ahead of myself! It's really no secret, but part of the trick involves using the 80-column (8563) chip's interlace mode, which results in twice the usual number of vertical pixels in the same space.

#### Not So Fast

The backbone of this entire capability is a feature known as interlace sync and video mode. Never mind the jargon. Video is displayed as two fields, one for even-numbered scan lines and one for odd-numbered. This is what we mean by the term *interlaced*. First one field is displayed, and as it fades, the other is displayed in the course of ½0 second. If not for this setup, your eyes would see the top of the screen fade before the next frame could be drawn, resulting in less pleasing, and probably more tiring, television.

In normal display mode, most computers display only one field; the other is left blank. This is fine for most purposes because the characters displayed are very sharp and there is no clarity problem in skipping the alternate field. By selecting interlaced mode, however, the computer can display twice as many dots vertically.

One additional note here: The muchtalked-about flicker associated with interlace mode on most computers happens because computers still display only one field every 1/30 second on alternate scan lines. True video and broadcast television display every 1/60 second. This means one field has a much longer time to fade before the other field is displayed. A long-persistence monitor has phosphor on its CRT, which takes longer to fade out and helps to minimize the flicker.

#### Uses for Interlace Mode

Interlace can be used in a number of ways. One use is making super-high-resolution graphics, such as those possible with I Paint. One drawback is that the resulting 640- × 400-pixel screen requires 32000 bytes for just a monochrome graphic, far more than the 16K supplied with the original 128. (The 128D comes with 64K of video RAM.) Interlace can be invoked in text mode, however, and no extra memory is required.

If you have PaperClip, the Pocket se-Dialogue, Desterm. SpeedScript 128 with SpeedSpell, you may have used a 50-row display mode. In this mode, these programs display 50 rows of 80 8 x 8 charactersnearly a full page of text. Now 4000 bytes are needed for screen memory. plus 4000 for color (attributes). Along with the 8K devoted to character definitions, this fits nicely into the 16K provided. An 80- x 50-row mode would also be handy in program editing, but it would require extensive rewriting of the screen editor, which would make this mode incompatible with most existing software.

As I said, there is another way. Thanks to the flexibility of the 8563, we can switch to 8 x 16 characters. This is just like the EGA characters of PC clones. This way, the screen editor still works with 25 rows of characters. It doesn't care how you've defined the characters. All it's concerned with is putting the right character code at the right position on screen. The 8563 takes care of the actual video rendition of the characters, much as the VIC chip does for 40 columns. As long as the program in question doesn't redefine the characters or reset the 8563, it will work just fine. And as you'll see, just a few modifications SpeedScript 128 let you use your favorite word processor with more clarity than ever before!

#### A Little Demo

To get our initial 8 x 16 set, we'll use

the 8 × 8 character set as a starting point, doubling each byte (scan line). So, if the original data was ABCDEFGH, the new character would be AABBCCDDEEFFGGHH. At this point, the skeptics are asking, "Why do this? Won't the result look essentially like the noninterlaced 8 × 8 characters?" Well, yes and no. Type in Demo 8 × 16 and run it for a demonstration of 8 × 16 characters and a hint of the possibilities for a new character set.

Typing It In

Demo 8 × 16 is written entirely in BA-SIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you attempt to run it.

The redefined characters in this demo give you some idea of the clarity involved with this mode. Not only do the characters look smoother, they allow more headroom between lines of text, giving a much cleaner overall look. After you run the demo, you can leave things as they are or reset the 128 by typing SYS 57721: SYS 65378.

**Building Characters** 

SuperFont Editor lets you take full advantage of this mode's capability. It allows you to create your own 8 × 16 superfont, although it can be used to edit 8 × 8 fonts as well. An accompanying program provides the ability to quickly load your creations directly to the 80-column character definitions.

SuperFont Editor is a full-featured editor, with commands for copy, paste, reverse, range copy, and more. All this is possible on any 128, not just those with 64K of VDC RAM.

In accomplishing its assigned tasks, SuperFont Editor uses the power of BASIC 7.0 in some instructional ways. It uses both the underused WINDOW command (to give a more pleasing environment) and the little-known and nearly undocumented RREG command (one of the most powerful commands in Basic 7.0). SuperFont Editor also shows some other interesting features of the 8563, such as independent cursor control.

Typing More In

Program 2 is SuperFont Editor, the

main program. All Commodore control and color codes have been defined as variables to make it easier to type. Pay attention to spaces in quotes, because they affect the appearance of the screen.

Program 3, Autoheader.maker, is a program which creates the header for setting the screen to 8 × 16 and redefining the characters. After entering and saving the program, run it, and it will create a file that is called SFONT.AUTOHEADER. The superfont you create will be appended to this file later. Once again, use The Automatic Proofreader to enter these programs without typos.

**Using SuperFont Editor** 

When you first run SuperFont Editor, you will be presented with the editing grid showing the first character of the first character set at the upper left. Below it, an information window shows the current character, its screen code, and the character set. At the upper right is a display of most of the commands available. In the lower right, the current character set is displayed.

First, let's talk about the function keys. Keys f1 and f2 are used to select the next higher or lower character in the set

Press f3 to select a character by typing it in. You may press Ctrl-9 (reverse on) to edit the reverse image codes.

Press f4 to alternate between the uppercase/graphics character set (set 0) and the uppercase/lowercase set (set

Press f5 to toggle  $8\times8$  or  $8\times16$  character mode. It doesn't do anything to the character set itself. With certain monitors, such as the 1902A and some 1084 series, the  $8\times16$  mode will look fuzzy. If it does, press Alt-f5 to try  $8\times15$  characters. Because of internal differences in some monitors, the characters should now look sharper.

Press f6 either to double the data in an  $8\times8$  character set, giving a low-res  $8\times16$  set to start from, or to restore the system character set. If you change back to  $8\times8$  mode after doubling the character set, you will see just the top half of the  $8\times16$  font. Everything still works; you just can't really read the screen.

Press f7 to load a previously saved

 $8 \times 16$  character set for further editing. You can get a directory by typing \$ for the filename. The No Scroll key holds the directory listing. If the name you want scrolls off the screen, press Stop to return to the filename query before the directory is finished.

Press f8 to save your work. This command saves the entire character set. It requires 33 free blocks on a disk.

Editing

Use the cursor keys to move around the editing grid. The Return key moves the cursor down one and all the way left. Full wrap is supported in all directions. The Home key takes you to the upper left, while CIr creates a blank character. The space bar toggles the pixel under the cursor on or off. The cursor doesn't advance on its own; you must move it yourself.

Use C to copy the current definition into a buffer, and use P to paste it in the place of a different character. This is very useful in quickly getting a start on similar characters. Press the Control key and 9 simultaneously to reverse the bit pattern of a character. This is useful after pasting a character to its reverse equivalent.

The # key can be used to enter a character by its screen code; this is particularly helpful for the comma, colon, and other characters which can't be entered from the 128's keyboard input routine.

Press O to access two additional options. Here, you can copy your normal characters to the reverse video characters within a set. This will save a lot of work! The second option lets you copy a range of characters from one set to the other. This is very flexible and fast.

To exit SuperFont Editor, press Run/ Stop. A small red window just above the lower left info window will ask if you really want to exit. Press Y to confirm.

#### That's It

When you've finished creating and saving an  $8-\times$  16-character font, you'll want to be able to load it in and select  $8\times$  16 mode painlessly. This is accomplished with the Sfont.autoheader program, the third program in this series.

You must append your font file to the end of the Sfont.autoheader, creating a file that can be run from BASIC. To do this, use the following command.

#### OPEN 15, DRIVE, 15, "CO:FILENAME= SFONT.AUTOHEADER, FONTFILE": CLOSE15

FILENAME is the resulting filename, and FONTFILE is whatever you named the font file you wish to install. Now run the new program. Your display will be set to interlaced, and the 8- × 16-character set will be loaded into the 8563S character memory.

If you get the fuzzy display mentioned earlier, list the program. Change SYS 7220,15 to SYS 7220,14 and resave the program. Don't change the length of the BASIC line, or the program will not work.

You may want to adjust your screen colors to minimize the flicker. Lowering the contrast and brightness settings can help, too, or invest in one of the dark Plexiglass panels to fit over your screen.

That's all there is to it! Once you've become used to a superfont, you won't want to go back. You'll have to, though, in some cases. This mode is not compatible with programs that use 50-row display or preview. You must disable the 8 × 16 characters first, by typing SYS 57721: SYS 65378.

#### **DEMO 8 × 16**

- XA 50 REM COPYRIGHT 1993 -COMP UTER PUBLICATIONS INTL L TD - ALL RIGHTS RESERVED
- XA 100 REM 8X16 INTERLACED CHA RACTER DEMO BY RICK KAN E
- ME 110 FAST: WR=DEC ("CDCC")
- HK 120 PRINTCHR\$(147)CHR\$(14)"

  8 X 16 INTERLACED CHARA
  CTER DEMO"
- JP 130 PRINT:PRINT"IF SCREEN R
  OLLS OR IS FUZZY, PRESS
  SPACE"
- RF 140 A=15:GOSUB500:PRINT"PRE SS ANY OTHER KEY TO CON TINUE"
- AD 150 DO:GETKEYK\$:IFK\$<>" "TH EN EXIT
- HJ 160 A=15+(A=15):GOSUB500:LO OP
- CF 170 PRINTCHR\$(145)CHR\$(145) CHR\$(27)"@":GOSUB1290:S YS4864
- QB 180 PRINT:PRINTCHR\$(2)"THIS
  IS THE STANDARD CHARAC
  TER SET:";TAB(50);"ABCD
  EABCDE
- JJ 190 PRINTTAB (50); "ABCDEABCD

|      |            | E  |     |
|------|------------|--|-----|
| RS   | 200        | The same of the sa | HQ. |
| DJ   | 220        | PRINTCHR\$ (145) CHR\$ (2) "U  |     |
|      |            | SE SUPER FONT EDITOR TO HAKE FINER CHARACTERS:   | IP  |
|      |            | "; TAB (50); CHR\$ (142) "ABC  |     |
| -    | 000        | DEABCDE"   | 3 P |
| ВЈ   | 230        | PRINTTAB (50); "ABCDEABCD<br>E"; CHR\$ (14)  |     |
| QG   | 240        | GOSUB1480  | KP  |
| FF   | 490<br>500 | END<br>SYSWR,1,36:SYSWR,3,8:SY   |     |
| *    | 11.0       | SWR, A, 9: SYSWR, A, 11: SYSW  | su  |
|      |            | R,A,23:SYSWR,A,29:RETUR  | РН  |
|      | 1280       | 3 :  |     |
| QD   | 1290       | A\$="":RESTORE:I=DEC("1<br>300"):READ A\$:DO UNTIL   |     |
|      |            |  | OK  |
|      |            | \$):I=I+1:READ A\$:LOOP:   |     |
| EX   | 1300       |  | H   |
|      |            | ,FA,A9,00,85,FB,85,FC,   | H   |
| MF   | 1310       | FØ,19,A9 DATA 30,85,FA,A9,00,85  | CD  |
| ME   | 1314       | ,FB,85,FC,FØ,ØD,A2,12,   |     |
|      | 1200       | 20, DA, CD   |     |
| PA   | 1320       | Ø DATA 85,FA,E8,20,DA,CD [ ,85,FB,A5,FA,A2,12,20,  | DΕ  |
|      |            | CC,CD,E8   |     |
| QP   | 1330       | Ø DATA A5,FB,20,CC,CD,A0,00,20,D8,CD,99,00,14,   |     |
|      |            | C8, C0, 08   | GΚ  |
| PS   | 1340       |  | BB  |
|      |            |  | PR  |
| QK   | 1350       | Ø DATA ØØ, B9, ØØ, 14, 20, CA  | D   |
|      |            | ,CD,20,CA,CD,C8,C0,08,<br>D0,F2,E6   |     |
| ED   | 1360       |  | PM: |
| FK   | 1480       | ,END<br>Ø RESTORE 1500:SYSWR,36,   |     |
| LK   | 140        | 7.0 7.6 7.0 6  | ES  |
|      |            | 079:READA\$:SYSWR-2,DEC  |     |
| PH   | 1490       | (A\$):NEXT<br>Ø SYSWR,32,18:SYSWR,16,1   |     |
| 700  |            | 9:FORI=ØTO79:READA\$:SY  | Q   |
|      |            | SWR-2, DEC (A\$): NEXT: RET URN  | RA  |
| PG   | 1500       |  | SX  |
|      |            | ,C6,FE,C6,C6,C6,C6,00,   |     |
| НА   | 1510       | 00,00,00<br>0 DATA 00,00,FC,66,66,66   |     |
|      |            | ,7C,66,66,66,66,FC,00,   |     |
| QE   | 1520       |  | AG  |
| QL.  | 1321       | ,CØ,CØ,CØ,C2,66,3C,ØØ,   |     |
| 17.3 | 1520       | 00,00,00   |     |
| XA   | 1530       | Ø DATA ØØ,ØØ,F8,6C,66,66<br>,66,66,66,66,6C,F8,ØØ,   |     |
| -    | 2.5.4      | 00,00,00   |     |
| EG   | 1540       | 78,68,60,62,66,FE,00,  | F   |
|      |            | 00,00,00   |     |
| JX   | 1550       |  |     |
|      |            | ,0C,7C,CC,CC,CC,76,00,   |     |

|          |      | 00,00,00  |
|----------|------|---|
| Q        | 156  | Ø DATA ØØ,ØØ,EØ,6Ø,6Ø,78                              |
|          |      | ,6C,66,66,66,66,7C,00,                                |
| IP       | 157  |   |
|          |      | ,C6,C0,C0,C0,C6,7C,00,                                |
| 3P       | 150  | 00,00,00<br>0 DATA 00,00,1C,0C,0C,3C                  |
| 31       | 158  | ,6C,CC,CC,CC,CC,76,00,                                |
|          |      | 00,00,00  |
| KP       | 159  | Ø DATA ØØ,ØØ,ØØ,ØØ,ØØ,70                              |
|          |      | ,C6,FE,C0,C0,C6,7C,00,                                |
| SUE      | PERF | ONT EDITOR  |
| РН       |      | REM COPYRIGHT 1993 - CO                               |
| n        | INO  | MPUTE PUBLICATIONS INTL                               |
|          |      | LTD - ALL RIGHTS RESER                                |
|          | 110  | VED   |
| ΟK       | 110  | REM WRITTEN BY RICK KAN                               |
| IJ       | 120  |   |
| KΗ       | 130  |   |
| )H       | 140  | FAST:GOSUB3000:GOSUB270:GOSUB390:GOSUB2010            |
| CD       | 150  |   |
|          |      | \$:K=INSTR(MN\$,K\$):LOOP                             |
|          | 100  | {SPACE}UNTIL K  |
| E        | 160  | ON K GOSUB 1260,1290,13<br>20,1350,1440,1220,1530,    |
|          |      | 1040,1060,1120,1090,206                               |
|          |      | 0,2120,1850,1750,1590,1                               |
| 111      | 170  | 620,2330,1170,1680,1380                               |
| SK<br>BB | 180  | LOOP  |
| PR       | 190  | :   |
| ij       | 200  | REM ERROR TRAP  |
| D        | 210  | IF EL=1970 THEN RESUME<br>{SPACE}NEXT: REM DIRECTO    |
|          |      | RY  |
| M        | 220  | IF EL>1759AND EL<1950TH                               |
|          |      | EN RESUME 1920: REM LOAD                              |
| S        | 230  | /SAVE<br>GOSUB550:PRINTCS\$LR\$:IN                    |
|          | 200  | PUT"EXIT Y/N"; EX\$: IFEX\$                           |
|          |      | <>"Y"THEN PRINTLB\$CS\$:G                             |
| 0        | 240  | OSUB 1220:RESUME<br>PRINTLG\$HM\$HM\$CS\$E\$"L"E      |
| 10       | 240  | \$"N";:END  |
| RA       | 250  |   |
| X        | 270  | DIMD(15),C(15),D\$(15),C                              |
|          |      | \$(15),PX\$(2),PC\$(1):WR=<br>DEC("CDCC"):RR=DEC("CDD |
|          |      | A"):WM=WR-2:RM=RR-2:VD=                               |
|          |      | 15:CO=Ø:CS=Ø  |
| 1G       | 280  | E\$=CHR\$(27):DL\$=CHR\$(20):IN\$=CHR\$(148):RT\$=CHR |
|          |      | \$(29):LT\$=CHR\$(157):DN\$                           |
|          |      | =CHR\$(17):UP\$=CHR\$(145)                            |
|          |      | :CR\$=CHR\$(13):SP\$=CHR\$(                           |
|          |      | 32):HM\$=CHR\$(19):CS\$=CH<br>R\$(147)                |
| F        | 290  |   |
| -        | 24   | 42):UL\$=CHR\$(2):UO\$=CHR                            |
|          |      | \$(130):FL\$=CHR\$(15):FO\$                           |
|          |      | =CHR\$ (143) : RV\$=CHR\$ (18)                        |

|   | 00,00,00   |             |       | 13:RRS=RRS+RT\$:NEXT                          |
|---|--|-------------|-------|---|
| 0 | DATA 00,00,E0,60,60,78   | AE          | 300   | DB\$=CHR\$(31):LR\$=CHR\$(1                   |
|   | ,6C,66,66,66,66,7C,00,   | *****       | 300   | 50):DG\$=CHR\$(152):GR\$=C                    |
|   | 00,00,00   | 1/1         |       | HR\$ (153): LB\$=CHR\$ (154):                 |
| 0 | DATA 00,00,00,00,00,70   | May 15      |       | LG\$=CHR\$(155):YL\$=CHR\$(                   |
|   | ,C6,C0,C0,C0,C6,7C,00,   |             |       | 158):CY\$=CHR\$(159)                          |
|   | 00,00,00   | GK          | 310   | PX\$(0) = LG\$+SP\$+CHR\$(167)                |
| 0 |  | 7           |       | ):PX\$(1)=DG\$+SP\$+CHR\$(1                   |
|   | ,6C,CC,CC,CC,CC,76,00,   |             |       | 67):FORI=ØTO7:PX\$(2)=PX                      |
|   | 00,00,00   |             |       | \$(2) +PX\$(0):NEXT:PC\$(0)                   |
| 0 | DATA 00,00,00,00,00,7C   | 1           |       | =CHR\$ (155): PC\$ (1) =CHR\$ (               |
|   | ,C6,FE,C0,C0,C6,7C,00,   | 316         |       | 152):EW=1:CA=82                               |
|   | 00,00,00   | SD          | 320   | FORI = ØTO15:C\$(I) = PX\$(2)                 |
| 0 | INT EDITOR   |             |       | :NEXT   |
| Ĭ |  | CP          | 330   | FKS="{8 SPACES}":FORI=0                       |
|   | REM COPYRIGHT 1993 - CO  | 1           |       | TO1:FORK=ØTO3:F\$=CHR\$(1                     |
|   | MPUTE PUBLICATIONS INTL  | 1 8         |       | 33+4*I+K):KEY(I+1+2*K),                       |
|   | LTD - ALL RIGHTS RESER   | 1           |       | F\$:MID\$(FK\$,I+1+2*K,1)=                    |
|   | VED  |             | - 1 - | F\$: NEXT: NEXT                               |
|   | REM WRITTEN BY RICK KAN  | RX          | 340   | MNS=DNS+RTS+UPS+LTS+SPS                       |
|   | E STATE TO BE A STATE OF THE ST | 1           |       | +HM\$+CS\$+F\$(0)+FK\$+"CPO                   |
|   | · Constitute de la contraction del contraction de la contraction d | 0.17        | 250   | #"+RV\$+CR\$                                  |
|   | TRAP 210   | QF.         | 350   | POKE 2603, 64: REM TURN ON                    |
|   | FAST: GOSUB3000: GOSUB270  |             | 200   | CURSOR  |
|   | :GOSUB390:GOSUB2010  | XR          |       | RETURN  |
|   | GOSUB1220:DO:DO:GETKEYK  | JJ          |       |   |
|   | \$:K=INSTR(MN\$,K\$):LOOP  |             |       | REM SCREEN SETUP<br>COLOR6,7:PRINTLC\$E\$"M"E |
|   | (SPACE)UNTIL K   | FS          | 390   | S"R"LBSHMSHMSCSS;                             |
|   | ON K GOSUB 1260,1290,13  | DI          | 400   | WINDOW 40,1,64,5,1:PRIN                       |
|   | 20,1350,1440,1220,1530,  | RJ          | 400   | TDN\$LT\$"{I}"RV\$DN\$LT\$SP                  |
|   | 1040,1060,1120,1090,206 0,2120,1850,1750,1590,1  |             |       | SDNSLTSSPSDNSLTSSPS"                          |
|   | 620,2330,1170,1680,1380  | 1           |       | {25 I}"RO\$;                                  |
|   | LOOP   | хн          | 11 a  | PRINTCYS;:WINDOW 39,1,6                       |
|   | END  | An          | 410   | 3,4,1   |
|   | :  | AC          | 420   | PRINTDNSTAB(4)"SUPER FO                       |
|   | REM ERROR TRAP   | 2000        | -     | NT EDITOR": PRINTTAB (3)D                     |
|   | IF EL=1970 THEN RESUME   |             |       | N\$"\C> 1993 COMPUTE"E\$"                     |
|   | {SPACE } NEXT : REM DIRECTO  | 1           |       | L";   |
|   | RY   | RP          | 430   | GOSUB830:GOSUB470                             |
|   | IF EL>1759AND EL<1950TH  | BB          | 440   | RETURN  |
|   | EN RESUME 1920: REM LOAD   | PR          | 450   |   |
|   | /SAVE  | FA          | 460   | REM EDIT WINDOW                               |
|   | GOSUB550: PRINTCS\$LRS: IN   | ER          | 470   | GOSUB760:GOSUB570                             |
|   | PUT"EXIT Y/N"; EXS: IFEX\$   | KB          | 480   | PRINTES"M"DB\$;: IFEW THE                     |
|   | <>"Y"THEN PRINTLB\$CS\$:G  |             |       | N WINDOW 4,2,19,17,1                          |
|   | OSUB 1220:RESUME   | KB          | 490   | PRINTLG\$;:WINDOW 2,1,17                      |
|   | PRINTLG\$HM\$HM\$CS\$E\$"L"E   |             |       | ,16,EW  |
|   | \$"N";:END   | AQ          | 500   | GOSUB960: PRINTHM\$LC\$UO\$                   |
|   |  |             |       | ;   |
|   | DIMD(15),C(15),D\$(15),C   | The same of |       | EW=0: PRINTLG\$; : RETURN                     |
|   | \$(15),PX\$(2),PC\$(1):WR=   | -           | 520   |   |
|   | DEC ("CDCC"): RR=DEC ("CDD   | GG          | 530   |   |
|   | A"):WM=WR-2:RM=RR-2:VD=  |             |       | 78,24:PRINTDN\$LT\$"{I}"R                     |
|   | 15:C0=Ø:CS=Ø   |             |       | V\$DN\$LT\$SP\$DN\$LT\$SP\$DN\$               |
|   | E\$=CHR\$ (27):DL\$=CHR\$ (20  | 100         |       | LT\$SP\$DN\$LT\$SP\$"{54 I}"                  |
|   | ):IN\$=CHR\$(148):RT\$=CHR   | 011         | - 10  | RO\$;   |
|   | \$(29):LT\$=CHR\$(157):DN\$  | GK          | 540   | PRINTLBS;:WINDOW 24,19,                       |
|   | =CHR\$(17):UP\$=CHR\$(145)   | DO          | EFO   | 77,23:RETURN                                  |
|   | :CR\$=CHR\$(13):SP\$=CHR\$(<br>32):HM\$=CHR\$(19):CS\$=CH  | DQ          | 220   | PRINTLB\$;:WINDOW 2,19,2<br>Ø,19:RETURN       |
|   | 32):HM\$=CHR\$(19):CS\$=CH<br>R\$(147)   | pn          | 560   |   |
|   | LCS=CHR\$(14):UC\$=CHR\$(1   | RE          |       | WINDOW 21,4,36,18                             |
|   | 42):UL\$=CHR\$(14):UC\$=CHR\$(1  |             |       | PRINTES"M"LGSSPS"C"SPSL                       |
|   | \$(130):FLS=CHR\$(15):FOS  | KU          | 200   | B\$"{I}-COPY                                  |
|   | =CHR\$ (143): RV\$=CHR\$ (18)  | AM          | 590   | PRINTSP\$RV\$"{3 I}                           |
|   | :ROS=CHR\$(146):FORI=0TO   |             |       | PRINTLG\$SP\$"P"SP\$LB\$"                     |
|   |  |             |       | OVEMBER 1993 COMPLIE G-27                     |
|   |  |             | 1     | DVEIVIBLE 1993 COMPUTE G-27                   |

|      |       | {I}-PASTE  | AO   | 940   |  | MK   | 1380 | C=7:R=R+1:IFR>15THENR=                     |
|------|-------|--|------|-------|--|------|------|--|
| · FM | 610   | PRINTSP\$RV\$"{3 I}  | -    |       | REM GET CHARACTER DATA   | MA   | 1300 | g  |
| AJ   | 620   | PRINTLG\$RT\$SP\$"CLR"SP\$L                                |      |       | AD=DEC("2000")+16*(CS*2  | MK   | 1390 |  |
|      |       | B\$"{I}  |      |       | 56+CO): AH=INT (AD/256): A   |      |      | PRINTRT\$LT\$;                             |
| RG   | 630   | PRINTLG\$RT\$SP\$"HOME"LB\$                                |      | 1     | L=AD-256*AH  |      |      | WINDOW 2,1+R,17,1+R:PR                     |
|      |       | RV\$SP\$   | SX   | 970   | SYSWR, AH, 18: SYSWR, AL, 19   |      |      | INT RTS LTS LEFTS (RRS,                    |
| EJ   | 640   | PRINTSP\$SP\$RV\$"{5 I}                                    | JX   | 980 1 | FORI = ØTO15: SYSRM: RREG D  |      |      | 14-2*C);:RETURN                            |
| EB   | 650   | PRINTLG\$SP\$"SPACE"SP\$LB                                 |      |       | (I):NEXT   | FK   | 1420 | : ALL SALES                                |
| 211  | cca   | \$"{I}-ON/OFF  | XR   |       | FORI = ØTO15:D\$(I) = "":FOR   | RA   | 1430 | REM TOGGLE PIXEL                           |
|      |       | PRINTSP\$RV\$"{7 I}  |      |       | B=7T0ØSTEP-1:D\$(I)=D\$(I  | QB   | 1440 | $PX=-((D(R)AND2\uparrow C)=\emptyset):P$   |
| QA   | 0/0   | PRINTLG\$"CTRL"LB\$"{I}"L G\$\$P\$"9"\$P\$LB\$"{I}-REVR    |      |       | ) +PX\$(-((D(I)AND2\big B)>0)  |      |      | RINTUL\$PX\$(PX)UO\$;:GOS                  |
|      |       | SE   | DII  |       | :NEXT  |      |      | UB1410                                     |
| ED   | 680   | PRINTSP\$RV\$"{4 I}"RT\$"                                  | RH   | 1000  | PRINTRTSLTS;:WINDOW 2,   | KF   | 1450 | MID\$(D\$(R),22-3*C,3)=P                   |
|      |       | {3 I}  |      |       | <pre>l+I,17,1+I:PRINTUL\$D\$( I);:NEXT:PRINTUO\$;</pre>  |      |      | X\$(PX):D(R)=XOR(D(R),2                    |
| BQ   | 690   | PRINTLG\$SP\$"#"SP\$LB\$"                                  | DS   | 1010  | RETURN   | DK   | 1460 | TC) REM WRITE TO VDC                       |
|      |       | {I}-CHARCODE #   |      | 1020  | A CONTRACTOR OF THE PROPERTY O |      |      | AD=DEC("2000")+R+16*(C                     |
| CG   | 700   | PRINTSP\$RV\$E\$"Q{3 I}                                    |      |       | REM FORWARD  |      | 11.0 | S*256+CO): AH=INT (AD/25                   |
| HS   | 710   | PRINTLG\$SP\$"O"SP\$LB\$"                                  | ME   | 1040  | CO=(CO+1) AND 255: GOSUB4  |      |      | 6):AL=AD-256*AH                            |
|      |       | {I}-OPTIONS  |      |       | 70:GOTO1220  | JS   | 1480 | SYSWR, AH, 18: SYSWR, AL, 1                |
| DB   | 720   | PRINTSP\$RV\$E\$"Q{3 I}"RO                                 |      |       | REM BACK   |      |      | 9  |
| nn.  | 720   | \$;  | KF   | 1060  | CO=CO-1:IFCO<0THENCO=2   |      |      | SYSWM, D(R)                                |
|      | 740   | RETURN   | -    | 1070  | 55<br>G0GUD 47.0 - G0M0 1 22.0   |      |      | RETURN                                     |
|      |       | REM INFO   |      |       | GOSUB470:GOTO1220<br>REM ALT CHARSET   |      | 1510 |  |
| BE   | 760   | PRINTDB\$;:WINDOW 4,21,1                                   |      |       | CS=-(CS=0):GOSUB470:GO   |      |      | REM CLEAR                                  |
|      | , , , | 9,23,1   | 1110 | 1000  | SUB2010:GOTO1220   | XD   | 1530 | AD=DEC("2000")+16*(CS*                     |
| CM   | 770   | PRINTYLS;:WINDOW 2,20,1                                    | GF   | 1100  |  |      |      | 256+CO): AH=INT (AD/256)<br>: AL=AD-256*AH |
|      |       | 7,22,1   | XQ   | 1110  | REM KEYBOARD ENTRY   | JF   | 1540 | GOSUB1220:FORI=@TO15:D                     |
| CF   | 780   | PRINTUO\$LC\$SP\$"CHARACTE                                 | XG   | 1120  | PRINTYLSES"M";:WINDOW  | 0.2  | 1310 | \$(I) = PX\$(2):D(I) = 0:PRI               |
|      |       | R: "SP\$CHR\$ (142-128*CS) S                               |      |       | {SPACE}2,20,17,20,1  |      |      | NTUL\$D\$(I);:NEXT:PRINT                   |
|      |       | P\$LT\$LT\$SP\$LC\$;:SYSWM,C                               | GS   | 1130  | PRINTUOS" CHARACTER"CH   |      |      | ·UO\$;                                     |
| 70   | 700   | O:PRINT  |      |       | R\$(142-128*CS);:INPUTC  | PM   | 1550 | SYSWR, AH, 18: SYSWR, AL, 1                |
| EU   | 190   | PRINTTAB (5) "CODE :"; STR   \$ (CO) : PRINTTAB (6) "SET : | -    | 1140  | H\$  |      |      | 9  |
|      |       | ";CS;  | F'S  | 1140  | PRINTHM\$TAB(11)":";:SY<br>SRM:RREGCO:GOSUB470:GO  | DF   | 1560 | FORI=ØTO15:SYSWM,D(I):                     |
| CK   | 800   | RETURN   |      |       | T01220   | DE   | 1570 | NEXT: GOTO1220                             |
|      | 810   |  | FK   | 1150  |  |      |      | REM COPY                                   |
| BD   | 820   | REM MENU   |      |       | REM GET CHAR CODE  |      |      | GOSUB550: PRINTGR\$CS\$DN                  |
| AD   | 830   | WINDOW38,6,79,24   |      |       | PRINTYLSES"M";:WINDOW  |      | 2000 | \$"COPYING":FORI=ØTO                       |
| CJ   | 840   | PRINTLGS"F1{2 SPACES}":                                    |      |       | {SPACE}2,21,17,21,1  |      |      | 15:C\$(I)=D\$(I):C(I)=D(                   |
|      |       | PRINT"{2 SPACES}"DG\$"                                     | CX   | 1180  | C=-1:PRINTUO\$"  |      |      | I):NEXT:PRINTLB\$CS\$:GO                   |
|      |       | -"LB\$"- FORWARD 1 CHARA                                   |      |       | {5 SPACES}CODE ";:INPU   |      |      | T01220                                     |
| CM   | 050   | CTER"  |      |       | TC: IFC<256ANDC>ØTHENCO  |      | 1600 |  |
| SM   | 850   | PRINTRT\$DG\$"F2 -"LB\$"<br>BACK 1 CHARACTER "             |      | 1100  | =C   |      |      | REM PASTE                                  |
| TE   | 860   | PRINTLGS"F3{2 SPACES}":                                    |      |       | GOSUB470:GOTO1220  | GE   | 1620 | AD=DEC("2000")+16*(CS*                     |
| 011  | 000   | PRINT"{2 SPACES}"DGS"                                      |      |       | REM HOME CURSOR  |      |      | 256+CO): AH=INT (AD/256)<br>:AL=AD-256*AH  |
|      |       | -"LBS" - SELECT FROM KEY                                   |      |       | PRINTES"M";:WINDOW 2,1   | PF   | 1630 | GOSUB1220:FORI=OTO15:D                     |
|      |       | BOARD"   |      |       | ,17,16:R=0:C=7   |      | 1030 | \$(I) = C\$(I) : D(I) = C(I) : P           |
| AQ   | 870   | PRINTRTSDGS"F4 -"LB\$"                                     | GX   | 1230  | SYSWR, 64, 10: RETURN  |      |      | RINTRT\$LT\$;:WINDOW2,1+                   |
|      |       | ALTERNATE CHARACTER SE                                     |      | 1240  | A STATE OF THE STA |      |      | I, 17, 1+I: PRINTUL\$D\$(I)                |
|      |       | T  | HQ   | 1250  | REM DOWN   |      |      | ;:NEXT                                     |
| RX   | 880   | PRINTLG\$"F5 -"LB\$" SE                                    |      |       | R=R+1:IFR>15THENR=0  | BE   | 1640 | SYSWR, AH, 18: SYSWR, AL, 1                |
|      |       | LECT 8/16 SCANLINES  |      |       | GOTO1400   |      |      | 9  |
| DB   | 890   | PRINTLG\$"{2 SPACES}"D G\$"-"LB\$"- "LG\$"+ALT "L          | 1    |       | REM RIGHT  | MD   | 1650 | FORI = ØTO15: SYSWM, D(I):                 |
|      |       | B\$"- TOGGLE 16/15   | ES   | 1290  | C=C-1:IFC<ØTHENC=7:R=R   | D.// | 1000 | NEXT:GOTO1220                              |
| TD   | 900   | PRINTRTSDGS"F6 -"LB\$"                                     | MD   | 1300  | +1:IFR>15THENR=0<br>GOTO1400   |      | 1660 |  |
| O K  | 200   | DOUBLE OR RESTORE 8-LI                                     |      |       | REM UP   |      |      | REM REVERSE<br>AD=DEC("2000")+16*(CS*      |
|      |       | NE FONT "  |      |       | R=R-1:IFR<ØTHENR=15  | 110  | 1000 | 256+CO): AH=INT (AD/256)                   |
| СВ   |       | PRINTLGS"F7{2 SPACES}":                                    |      |       | GOTO1400   |      |      | :AL=AD-256*AH                              |
|      |       | PRINT"{2 SPACES} "DG\$"                                    |      |       | REM LEFT   | НМ   | 1690 | GOSUB1220:FORI=0TO15:D                     |
|      |       | -"LB\$"- LOAD FONT"  | SH   | 1350  | C=C+1:IFC>7THENC=Ø:R=R   |      |      | (I) = XOR (D(I), 255):D\$(I                |
| HG   | 920   | PRINTRTSDGS"F8 -"LB\$"                                     |      |       | -1:IFR<0THENR=15   |      |      | ) = "": FORB=7TOØSTEP-1:D                  |
|      |       | SAVE FONT "  |      |       | GOTO1400   |      |      | (I) = D(I) + PX(-(D(I))                    |
| MB   | 930   | RETURN   | GD   | 1370  | REM RETURN KEY   |      |      | AND2 TB) >Ø)): NEXT                        |
| G-2  | 8 0   | COMPUTE NOVEMBER 1993                                      |      |       |  |      |      |  |

| SG | 1700 | PRINTRT\$LT\$;:WINDOW 2,<br>1+I,17,1+I:PRINTUL\$D\$(  |          |           | :NEXT<br>PRINTLC\$;:RETURN  | HD | 2460  | SYSWR, AH, 18: SYSWR, AL, 1   |
|----|------|---|----------|-----------|---|----|-------|---|
| CA | 1710 | I);:NEXT<br>SYSWR,AH,18:SYSWR,AL,1  |          | 2040      | REM TOGGLE 8/16 SCANLI  |    |       | FORI=ØTO15:SYSWM, XOR (D (I),255):NEXT  |
| ES | 1720 | FORI = ØTO15: SYSWM, D(I):  | ME       | 2060      | NE SCREEN IF VR=1AND (PEEK(211)A  | RS | 2490  |   |
|    | 1730 |   |          |           | ND8)>Ø THEN VD=14-(VD=<br>14):GOTO2Ø8Ø  |    |       | REM TRANSFER BETWEEN C<br>HARSETS   |
|    |      | REM SAVE  F\$="":GOSUB540:PRINTGR  \$CS\$DN\$" SAVE:":INPUT"  FILENAME";F\$:IF F\$=""  THEN1820   |          |           | IF VR THEN 2090<br>VR=1:SYSWR,1,36:SYSWR,<br>3,8:SYSWR,VD,9:SYSWR,V<br>D,11:SYSWR,VD,23:SYSWR,VD,29:RETURN    | SB | 2510  | GOSUB540:PRINTLG\$CS\$"T<br>RANSFER BETWEEN CHARAC<br>TER SETS":INPUT"SOURCE<br>SET";S:IFS<ØORS>1THEN<br>2610 |
|    |      | INPUT" DEVICE #";DR:IF<br>DR<80RDR>15THEN1820   | BP       | 2090      | VR=0:SYSWR,0,8:SYSWR,7,9:SYSWR,7,11:SYSWR,7,  | KM | 2520  | INPUT"FIRST SOURCE COD<br>E";FC: IFFC<ØORFC>255TH   |
| SR | 1770 | AD=DEC("2000"):AH=INT(<br>AD/256):AL=AD-256*AH  |          | 2100      |   | SX | 2530  | EN2010<br>INPUT" LAST SOURCE COD  |
|    |      | SYSWR, AH, 18: SYSWR, AL, 1   |          |           | REM DOUBLE CHARACTER D  |    |       | E";LC:IFLC <fcorlc>255T<br/>HEN2010</fcorlc>  |
|    |      | OPEN 2,DR,2,F\$+",U,W":<br>A=DS:A\$=DS\$:IFATHEN181<br>Ø<br>SYSDEC("1386")  | QH       | 2120      | GOSUB540: PRINTYL\$CS\$DN<br>\$" SELECT : "RV\$"D"RO\$<br>" - DOUBLE 1ST EIGHT L<br>INES": PRINTTAB(10) RV\$" | ХН | 2540  | INPUT"1ST DESTINATION<br>{SPACE}CODE";DC:IFDC<0<br>ORDC>255-LC-FCTHENPRIN<br>TUPSES"O";:GOTO2540              |
| EJ | 1810 | CLOSE2: PRINTAS: SLEEP2   |          |           | R"RO\$" - RESTORE SYSTE<br>M FONT": PRINT"  |    |       | CS=-(S=0):GOSUB2010   |
|    | 1830 | GOSUB2010:GOTO1220  |          |           | {2 SPACES}ANY OTHER KE  | XS | 2560  | SA=DEC("2000")+16*(S*2<br>56+FC):SH=INT(SA/256):  |
|    |      | REM LOAD  | DC       | 2120      | Y ABORTS" GETKEYK\$: IFK\$="R"THENG   |    | 0.550 | SL=SA-256*SH  |
| PE | 1000 | GOSUB540:F\$="":DR=0:PR INTGR\$CS\$DN\$" LOAD: ": INPUT" DEVICE #":DR:IF  |          | 2130      | OSUB2010:SYSDEC("FF62"):GOTO2200  | FE | 25/0  | DA=DEC("2000")+16*(CS*<br>256+DC):DH=INT(DA/256)<br>:DL=DA-256*DH   |
| SF | 1860 | DR<80RDR>15THEN1930<br>PRINTDN\$"ENTER '\$' FOR   | BS       | 2140      | IFK\$<>"D"THEN GOSUB201<br>0:GOTO2200   | JC | 2580  | SYSWR, DH, 18: SYSWR, DL, 1   |
|    |      | DIRECTORY"UP\$UP\$:INPU T"FONT FILE TO LOAD";F  | GB       | 2190      | GOSUB2010<br>SYSDEC("1300")<br>GOSUB470:GOTO1220  | KK | 2590  | SYSRR,,24:RREGA:SYSWR,<br>A OR128,24:SYSWR,SH,32<br>:SYSWR,SL,33  |
| GF | 1870 | IF F\$="\$"THEN GOSUB196<br>0:GOTO1850:ELSE IF F\$=   | XB<br>AB | 2310 2320 | :<br>REM OPTIONS  | ВН | 2600  | FORI = FC TO LC:SYSWR, 1<br>6,30:NEXT   |
| DG | 1880 | ""THEN 1930<br>AD=DEC("2000"):AH=INT(   |          |           | GOSUB540: PRINTLG\$CS\$YL<br>\$" OPTIONS: "LG\$   |    |       | RETURN<br>RESTORE: I = 4864: DO: READ   |
| KE | 1890 | AD/256):AL=AD-256*AH<br>PRINTES"M";:GOSUB2010:<br>SYSWR,AH,18:SYSWR,AL,1  | BR       | 2340      | PRINTTAB (10) RV\$"R"RO\$" - COPY NORMAL TO "RV\$ "REVERSE"RO\$" CHARACTE                                     | AE | 3010  | A\$:IFA\$="END" THEN EXI<br>T<br>POKEI,DEC(A\$):I=I+1:LO  |
| JA | 1900 | 9<br>OPEN 2,DR,2,F\$:A=DS:D\$   | вх       | 2350      | RS" PRINTTAB(10)RV\$"T"RO\$"  |    |       | OP:RETURN DATA 20,0F,13,A9,20,85  |
|    |      | =DS\$:IFATHEN1920<br>SYSDEC("1366")   |          |           | - TRANSFER BETWEEN CH<br>ARACTER SETS"  |    |       | ,FA,A9,00,85,FB,85,FC,<br>F0,19,A9  |
|    |      | CLOSE2:PRINTHM\$LR\$D\$;:<br>SLEEP2   | JC       | 2360      | GETKEYK\$: IFK\$<>"R"ANDK<br>\$<>"T"THEN GOSUB2010:G  | CJ | 3030  | DATA 30,85,FA,A9,00,85<br>,FB,85,FC,FØ,0D,A2,12,  |
|    |      | EW=1:GOSUB390:GOSUB201<br>0:GOTO1220  | KQ       | 2370      | OTO238Ø<br>ONINSTR("RT",K\$)GOSUB2<br>410,251Ø  | JE | 3040  | 20,DA,CD<br>DATA 85,FA,E8,20,DA,CD  |
|    | 1940 | REM DIRECTORY   |          |           | GOTO1220  |    |       | ,85,FB,A5,FA,A2,12,20,<br>CC,CD,E8  |
| DX | 1960 | PRINTDB\$;:WINDOW 51,1,   |          | 2390      |   | CQ | 3050  | DATA A5, FB, 20, CC, CD, A0   |
|    |      | 78,18,1:PRINTYL\$E\$"L";<br>:WINDOW 49,0,76,17,1:P  | MJ       | 2400      | REM COPY TO REVERSE VI<br>DEO CHARSET   |    |       | ,00,20,D8,CD,99,00,04,<br>C8,C0,08  |
|    |      | RINTLRS" PRESS NO SCRO  |          |           | GOSUB2010   | JC | 3060  | DATA DØ, F5, A5, FA, A2, 12   |
|    |      | LL TO PAUSE"E\$"Q"YL\$CR  | DQ       | 2420      | FORCO=ØTO127:AD=DEC("2   ØØØ")+16*(CS*256+CO):A   |    |       | ,20,CC,CD,A5,FB,E8,20,<br>CC,CD,A0  |
|    |      | CATALOG ON U(DR)  |          |           | H=INT (AD/256):AL=AD-25   | RC | 3070  | DATA 00,89,00,04,20,CA  |
|    | 1980 | RETURN  | QF       | 2430      | 6*AH<br>SYSWR, AH, 18:SYSWR, AL, 1  |    |       | ,CD,20,CA,CD,C8,C0,08,  |
| 1  |      | REM DISPLAY CHARSET   |          |           | 9   | JB | 3080  | DØ,F2,E6<br>DATA FC,A6,FC,DØ,B6,60  |
| GR | 2010 | GOSUB530: PRINTLG\$CHR\$(<br>142-128*CS); CS\$;   | KP       | 2440      | FORI=ØTO15:SYSRM:RREG<br>{SPACE}D(I):NEXT   |    |       | ,A2,00,86,FB,86,FA,A2,<br>02,20,C6  |
| MA | 2020 | FORI = ØTO4: PRINTSP\$;: FO   | JA       | 2450      | AD=DEC("2000")+16*(CS*<br>256+CO+128):AH=INT(AD/  | XQ | 3090  | DATA FF, 20, CF, FF, 20, CA   |
|    |      | RJ=0TO51:SYSWM, (J+51*I) AND255:NEXT:PRINTCR\$;   |          |           | 256):AL=AD-256*AH   |    |       | ,CD,E6,FA,DØ,F6,E6,FB,<br>A6,FB,E0  |
|    |      | , and the state of the sta |          |           |   |    |       | ,,  |

MF 3100 DATA 20,90,EE,4C,CC,FF,A2,00,86,FB,86,FA,A2,02,20,C9

JQ 3110 DATA FF,20,D8,CD,20,D2 ,FF,E6,FA,D0,F6,E6,FB, A6,FB,E0

DD 3120 DATA 20,90,EE,4C,CC,FF,END

#### **AUTOHEADER.MAKER**

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FQ 10 REM SUPERFONT AUTOHEADER MAKER

FP 20 INPUT "DESTINATION DEVIC E";DD:IFDD<80RDD>30THEN2

AC 30 OPEN2, DD, 2, "SFONT. AUTOHE ADER, P, W"

JF 40 RESTORE:DO:READ AS:IFAS=
"END"THEN EXIT

ES 50 PRINT#2, CHR\$ (DEC(A\$));:L

KX 60 FORI=0TO112:PRINT#2,CHR\$
(96);:NEXT:CLOSE2

GB 1000 DATA 01,1C,31,1C,0A,00 ,9E,37,32,32,30,2C,31, 35,3A,8F

MQ 1010 DATA 20,53,55,50,45,52,46,4F,4E,54,20,41,55,54,4F,4C

GS 1020 DATA 4F,41,44,20,28,43 ,29,20,52,49,43,4B,20, 4B,41,4E

AH 1030 DATA 45,00,00,00,00,00,AA ,AD,30,D0,48,09,01,8D, 30,D0,8A

GJ 1040 DATA 48,A2,24,A9,01,20, ,CC,CD,A2,08,A9,03,20, CC,CD,68

AG 1050 DATA A2,09,20,CC,CD,A2,08,20,CC,CD,A2,17,20,CC,CD,A2

CS 1060 DATA 1D,20,CC,CD,A2,13 ,A9,00,20,CC,CD,CA,A9, 20,20,CC

KR 1070 DATA CD,A9,1D,85,FB,A9 ,00,85,FA,A0,00,B1,FA, 20,CA,CD

PP 1080 DATA C8,D0,F8,E6,FB,A5 ,FB,C9,3D,D0,F0,68,8D, 30,D0,60,END

Rick Kane is the author of I Paint, a trademark of Living Proof, Ltd.

#### **SCRIPT FIX**

By Rick Kane

If you looked at the previous article on Super Screen Fonts, you know how this enhanced character mode can sharpen the onscreen text of a 128 from  $8\times8$  pixels to  $8\times16$  pixels. Wouldn't it be great to take advantage of this enhanced mode

when using SpeedScript 128, COM-PUTE's word processing program? You can with Script Fix and Super Screen Fonts.

Script Fix is written in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save the program before you attempt to run it.

Modifying SpeedScript

When you run Script Fix, it will ask for a copy of SpeedScript 128 to load and modify. If you already use one of the SpeedScript enhancement programs such as SpeedSpell, start with an unmodified version of SpeedScript. If the patch program doesn't find the expected bytes where the patch goes, it will abort. If it is successful, Script Fix will ask for a filename for the modified version. The program will suggest adding SF to the source file's name, truncating it if it's longer than 16 characters.

When all done, run your installation program to set up the 8 × 16 characters. Then run the modified SpeedScript. It's beautiful!

SpeedScript with superfonts should be compatible with other add-ons to SpeedScript 128, especially if they are installed after the superfont fix. There is one certain caveat: Don't try to use the 50-row mode of SpeedSpell, or your screen will turn to garbage.

#### SCRIPT FIX

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PX 100 DV=PEEK(186):IFDV<8THEN DV=8

CQ 110 GRAPHIC CLR:G=RGR(0):GR APHIC 1:GRAPHIC G

HH 120 TRAP 265:PRINTCHR\$(147)

"SPEEDSCRIPT 128 : SUPE
RFONT FIX"

HX 130 F\$="SPEEDSCRIPT 128"

JQ 140 PRINT "LOAD FILENAME {2 SPACES}"+F\$+CHR\$(27) +"J";TAB(13);:INPUT N\$

XH 150 PRINT "FROM DEVICE ";DV ;CHR\$(27)"J";TAB(11);:I NPUT FD

PF 160 IF FD<8 OR FD>30 THEN 1

CB 170 SF\$=LEFT\$(N\$,13)+".SF"

XQ 180 PRINT"LOADING...":BLOAD (N\$),B0,P(DEC("1C01"))

GB 190 IFPEEK(174) + PEEK(175) \* 2 56<>13578 THEN PRINT"I {SPACE}DON'T KNOW THIS {SPACE}VERSION!":GRAPHI CCLR:END

RK 200 PRINT"PATCHING...":REST ORE:DO:READ ADR:IF ADR< 0 THEN EXIT

XA 210 READ BYTES:FORI= 0TO BY TES:READ WAS,IS:IF PEEK (ADR+I) <>WAS THEN 280

FK 220 POKE ADR+1,1S:NEXT:LOOP
HB 230 PRINT"SUCCESSFUL!":PRIN
T "SAVE FILENAME

{2 SPACES}"+SF\$+CHR\$(27)+"J";TAB(13);:INPUT N\$

KQ 240 PRINT "TO DEVICE ";FD;C HR\$(27)"J";TAB(9);:INPU T TD

ED 250 IF TD<8 OR TD>30 THEN 2

HJ 260 PRINT"SAVING...":BSAVE(
N\$),B0,P(7169)TO P(1357
8),U(TD)

XM 265 IF DS THEN PRINTDS\$

EG 270 GRAPHICCLR: END

DR 280 PRINT"UNEXPECTED BYTES {SPACE}FOUND!":GRAPHICC LR:END

BJ 290 DATA 7182,0,32,44

JK 300 DATA 7862,8,120,32,169, 86,1,224,141,32,4,0,10, 192,76,108,83,0,250,10

PK 310 DATA -1

Rick Kane is an independent video and film cameraman who lives in Minneapolis, Minnesota.

#### **DOUBLE SIZE**

By Rick Kane

Here's another program in which the 8 × 16 characters can be used on a 128. Be sure to start reading the Super Screen Fonts program in this issue for full details.

In noninterlaced mode, the 8 × 16 characters are twice as tall as regular characters. In combination with pixel doublewidth mode, they can be made twice as wide as well. The end result is a screen 40 characters wide and 12 characters tall.

This added size might be useful for instore advertising displays, giving your eyes a rest while programming, or allowing everyone to sit back instead of huddling around the monitor at computer club meetings!

Double Size is written entirely in BA-SIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you attempt to run it.

**Bigger Text** 

If you run Double Size without first installing an  $8\times 16$  character set created from Super Font, you'll get the standard characters with double line spacing—a result which might have some uses of its own. Normally, you'll want to install your favorite set or create one especially for use in double-size mode.

This program is compatible with the screen editor as long as you don't define a new window or undefine the window by pressing Home twice. Your BA-SIC programs, program listings, and directories will work normally. Again, reset to normal by typing SYS 57721: SYS 65378.

Beyond Big

These techniques aren't limited to  $8 \times 16$  characters. You could easily define characters that are  $8 \times 9$ ,  $8 \times 12$ , or even  $8 \times 5$  if you wanted. You'd have to adjust the total number of screen rows displayed (8563 registers 4, 6, 7, and 9 particularly) according to your needs.

With a little more difficulty, you can go beyond 16, up to 8- x 32-pixel characters! Above 16, though, character memory is handled differently. The system automatically allocates 16 bytes per character for any character set 8 × 16 or smaller. Above that, it switches to 32 bytes per character, so you need to reposition the start of each definition at 32-byte intervals, instead of 16-byte intervals. Also, note that one 256-byte character set now takes 8192 bytes. This means that for all practical purposes, you can use only one character set if you want to have any memory for display and attributes!

To try out even larger text, type in Beyond Big. It is also written in BASIC and should be entered with The Automatic Proofreader.

Save the program and then run it. Beyond Big asks for an 8 × 16 superfont file to read. Then it asks which character set to use. Character set 0 is uppercase/graphics, and set 1 is uppercase/lowercase. The file is read and then automatically doubled for 8- × 32-pixel characters.

Then the screen is set for a 40-column by 6-row screen! That's not a lot of space, but, as usual, the screen edi-

tor works normally. Colors, blink, underline, and so on are all available for scrolling, crawling text, or other clever (and big) displays.

#### **DOUBLE SIZE**

- BM Ø REM COPYRIGHT 1993 COMP UTE PUBLICATIONS INTL LTD - ALL RIGHTS RESERVED
- QH 10 REM DOUBLE HIGH/WIDE USI NG 8X16 & PIXEL DOUBLE W IDTH
- GG 20 REM BY RICK KANE
- EH 100 WR=DEC ("CDCC")
- RJ 110 SYS WR,16,4:SYS WR,15,7 :SYS WR,12,6:SYS WR,15, 9:SYS WR, 15,23:SYS WR, 15,11:SYS WR,15,29:SYSW R,0,8:REM HEIGHT
- AQ 120 SYSWR,64+16+7,25:SYSWR,63,0:SYSWR,40,1:SYSWR,53,2:SYSWR,137,22:SYSWR,40,27:SYSWR,63,34:SYSWR,52,35:REM WIDTH
- QC 130 PRINT"{2 HOME}{CLR}":WI NDOW 0,0,39,11

**BEYOND BIG** 

- DJ Ø REM COPYRIGHT 1993 COMP UTE PUBLICATONS INTL LTD {SPACE}- ALL RIGHTS RESER VED
- JK 10 REM 8X32 PIXEL CHARACTER
- GG 20 REM BY RICK KANE
- CC 30 RR=DEC("CDDA"):WR=DEC("CDCC")
- XG 40 GOSUB1000
- SG 50 INPUT"DEVICE"; DV:IFDV<80 RDV>30THEN50
- SR 60 INPUT "FONT FILE"; F\$
- XQ 70 INPUT"WHICH CHARACTER SE T";CS:IFCS THEN CS=1
- QK 100 OPEN2,8,2,F\$:SYSDEC("CD CC"),32,18:SYSDEC("CDCC "),0,19:SYS4864,CS:CLOS E2
- AX 110 SYSWR,31,9:SYSWR,31,23:
  SYSWR,31,11:SYSWR,31,29
  :SYSWR, 6,6:SYSWR, 8,7:
  SYSWR, 8,4:REM SET 32 P
  IXEL NON INTERLACED
- DF 120 SYSWR,64+16+7,25:SYSWR, 63,0:SYSWR,40,1:SYSWR,5 3,2:SYSWR,137,22:SYSWR, 40,27:SYSWR,63,34:SYSWR
- ,52,35:REM DOUBLE WIDTH
  MP 130 PRINT"{2 HOME}{CLR}":WI
  NDOW 0,0,39,5:END
- HX 1000 RESTORE: I=4866: DO: READ A\$: IFA\$="END" THEN EXI
- RJ 1010 POKEI, DEC(A\$):I=I+1:LO OP:RETURN
- XP 1020 DATA C9,00,F0,1A,A2,00,86,FB,86,FA,A2,02,20,

C6, FF, 20

BS 1030 DATA CF, FF, E6, FA, D0, F9 , E6, FB, A6, FB, E0, 10, 90, F1, A2, 00

BC 1040 DATA 86,FB,86,FA,A2,02 ,20,C6,FF,20,CF,FF,48, 20,CA,CD

AD 1050 DATA 68,20,CA,CD,E6,FA,D0,F1,E6,FB,A6,FB,E0,10,90,E9

XR 1060 DATA 4C, CC, FF, END

Rick Kane has been programming 64s and 128s since 1983.

#### **VERTISCROLL**

By Daniel English

We've all seen programs that scroll text along the bottom of the screen or inside the screen's border. VertiScroll is a program for the 64 that takes this idea to another extreme by allowing a message to scroll smoothly down the left side of the screen. The scrolling message won't interfere with any text, character, or bitmap display.

As you may have guessed, the letters in the scroll are created with sprites. What you may not have guessed is that the entire message uses only a single sprite. The remaining seven sprites are unaffected by VertiScroll. VertiScroll efficiently uses the 64's raster interrupt feature to create its effects. You'll find that a smooth scrolling vertical message can enhance many programs.

**Getting Started** 

VertiScroll consists of three programs: two machine language programs and a BASIC one. Of the two machine language files, one is a code file and one a sprite file. To enter them, use MLX, COMPUTE'S machine language entry program. See "Typing Aids" elsewhere in this section. To enter VS.Code, respond with the following starting and ending addresses when MLX prompts.

Starting address: 4000 Ending address: 4217

To enter VS.Letters, respond with the following starting and ending addresses when MLX prompts.

Starting address: 5000 Ending address: 5CC7 The third program, VertiScroll, is the text editor. Since it is written in BASIC, use The Automatic Proofreader to help avoid typing errors. Again, see "Typing Aids." All three files should be saved to the same disk. Be sure to save the programs with the filenames as listed, since the VertiScroll editor searches for and loads these files.

#### The Editor

To do a quick test of VertiScroll, load the editor and type *RUN*. You will then be instructed to press the space bar to enter the text editor. When the screen clears, you may begin entering your message. All letters, numbers, and most punctuation are available.

When typing, don't attempt to wrap words from one screen line to the other; let them cut off. They will be continuous in the scroll. You may use a maximum of 12 lines.

When you have finished entering your message, end it with the @ symbol. This tells the computer when to repeat the message. When you press Return, your message will be stored.

#### Going Vertical

When your scroll has been stored, you have a chance to preview your message as it will appear. You will then be prompted to either edit your message or save it to disk.

After your message has been saved on disk, it's ready to be used in your own program. All you need to do is have your program load VS.LETTERS, VS.CODE, and your message.

The command to begin scrolling is SYS 16384. To disable the scrolling, enter SYS 16387. Don't press Run/Stop and Restore to disable the scroll, because this will crash the computer.

#### **Custom Letters**

VertiScroll was designed to be customized. The sprite data is stored in bank 1, at \$5000. You can edit all of the letters, numbers, and punctuation using a sprite editor.

Once the scroll has been installed using the command SYS 16384, you can change the color, size, and location of the message. Changing the values for the sprite 0 registers will change the entire scroll. For example, to move the scrolling text to the middle of the

screen, try POKE 53248,150.

You can change colors by altering the sprite color registers. See the table at the end of the article for a list of POKES.

The default location for the text is at \$4220. If you want to put your text somewhere else, POKE 16076, HI: POKE 16078,LO will change the pointer. You will also need to change the start and end in line 40 of the editor. Remember, there is still a 12-line (480 character) maximum.

When you enter SYS 16384, all graphic data including the text screen is moved to bank 1. When you disable the scroll, the data is restored to bank 0. The letters scroll independently, leaving the computer free for other tasks. Whether you're writing business software or just playing games, VertiScroll will create a dazzling display.

#### VertiScroll POKEs

Here are a list of POKEs that you might want to use to customize your onscreen message.

POKE 53248, X—Move scroll left and right

POKE 53264, 1—Move scroll beyond 255th x position

POKE 53269, 0—Hide letters

POKE 53269, 1—Show letters POKE 53275, 1—Display scroll under screen text

POKE 53275, 0—Display scroll over screen text

POKE 53287, X—Change first color of scroll message

POKE 53285, X—Change second color

POKE 53286, X—Change last color POKE 53277, 1—Double width scroll POKE 53277, 0—Normal width scroll

#### VS.CODE

4000:4C 9D 41 4C 78 40 00 26 E5 4008:A9 01 8D 19 D0 20 67 40 F6 4010:AD 06 40 C9 00 F0 19 C9 4D 4018:0A FØ 27 AD 01 DØ 18 69 7E 4020:15 8D 01 D0 8D 03 D0 8D 63 4028:12 DØ 20 B5 40 4C 5A 49 8D Ø3 4030:AD 07 40 80 Ø1 DØ 4038:D0 8D 12 D0 20 B5 40 4C 78 4040:5A 40 AD 01 D0 18 69 15 92 4048:8D 01 DØ 8D Ø3 DØ 8D 12 4B 4050:D0 20 B5 40 20 CA 40 20 C8 4058:CA 40 AD 0D DC 29 01 F0 53 4060:03 4C 31 EA 4C BC FE EE 8C 4068:06 40 AD 06 40 C9 0B F0 42 4070:01 60 A9 00 8D 06 40 60 24 4078:A9 00 8D 15 D0 78 A9 31 BD 4080:8D 14 03 A9 EA 8D 15 03 4088:A9 81 8D 0D DC A9 00 8D DB 4090:1A DØ 8D ØD DC A9 1B 8D 26 4098:11 DØ 58 A9 15 8D 18 40A0: A9 C7 8D 00 DD A9 3F 8D 40A8:02 DD A9 04 8D 88 02 A9 53 40B0:93 20 D2 FF 60 AC 06 40B8:B9 BF 40 8D F8 47 60 40 40C0:40 40 40 40 40 40 40 40 40 41 40C8:40 40 EE 07 40 AD 07 40 40D0:C9 3B FØ al 60 A9 26 80 40D8:07 40 A0 00 B9 BF 40 99 40E0:A7 02 C8 CØ ØA DØ F5 AØ 02 99 CØ 40 C8 40E8:00 B9 A7 40F0:C0 0A D0 F5 A0 00 B1 02 40F8:AA EØ 00 F0 44 EØ 1B 4100:11 90 15 EØ 90 EØ 23 3C 4108:19 E0 3F FØ 1D A2 58 4C B6 4110:2F 41 8A 18 69 58 AA 4C 69 20 4118:2F 41 8A 18 4C 4120:2F 8A 18 69 1C AA 4C 41 4128:2F 41 A2 58 4C 2F 41 8A 98 02 4130:8D BF 40 A5 18 69 4138:85 02 A5 03 69 00 85 03 30 4140:60 AØ 42 A2 20 86 Ø2 84 31 60 4148:03 AD ØE DC 29 FE A5 Ø1 29 FB 85 Ø1 1B 4150:0E DC 4158:AØ DØ A2 ØØ 86 FA 84 FB D8 4160:A0 48 A2 00 86 FC 84 4168:AØ ØØ Bl FA 91 FC A5 FA E7 4170:18 69 01 85 FA A5 FB 69 A1 4178:00 85 FB A5 FC 18 69 01 FD 69 00 85 FD 4180:85 FC A5 4188:A5 FD C9 50 D0 DA A5 01 D9 4190:09 04 85 01 AD 0E DC 09 C1 4198:01 ØE DC 60 A9 00 8D C5 8D 41AØ:15 DØ 8D 1B DØ A9 Ø1 8D 41A8:1C DØ A9 1A 8D ØØ DØ A9 41BØ:00 8D 10 DØ A9 01 8D 05 41B8:DØ A9 ØD 8D 25 DØ A9 41C0:8D 26 DØ A9 C6 8D ØØ DD 92 41C8:A9 3F 8D 02 DD A9 44 41DØ:88 Ø2 A9 93 20 D2 FF A9 41D8:40 A0 00 99 BF 40 C8 C0 8E 20 41 41 20 41E0:0B D0 F8 4A D7 78 A9 41E8:41 A9 13 8D 18 DØ 41FØ:1B 8D 11 DØ A9 Ø1 8D 1A 1A 41F8:DØ A9 FF 8D Ø6 4Ø A9 Ø8 B3 4200:8D 14 03 A9 40 8D 15 03 B0 4208:A9 7F 8D ØD DC 58 A9 Ø1 6Ø 4210:8D 15 D0 60 00 00 00 00 C0

#### VS.LETTERS

5000:00 00 00 00 00 00 00 00 A0 5008:00 00 00 00 00 00 00 ØØ 00 00 00 5010:00 00 00 00 5018:00 00 00 00 00 00 00 00 B8 5020:00 00 00 00 00 00 00 00 C0 5028:00 00 00 00 aa aa 00 90 00 00 00 00 00 DØ 5030:00 00 00 5038:00 00 00 98 98 98 98 98 00 aa aa aa 5040:00 00 00 00 00 00 00 00 00 aa E8 5048:00 00 5050:00 00 00 00 00 A0 00 5058:AA 40 00 AA 55 00 0A 55 10 5060:3F 00 15 3F 00 00 3F 5068:00 00 00 00 00 00 00 00 00

52A0:FF 00 00 3C 00 00 00 00 09 5070:00 00 00 00 00 00 00 00 11 54D0:00 00 AA 50 00 AA 55 00 29 5078:00 00 aa 00 00 00 00 00 19 52A8:00 00 00 00 00 00 00 00 4D 54D8:AA 55 FØ AØ 55 FF AØ Ø5 45 5080:00 00 00 00 00 00 00 00 21 52B0:00 00 00 00 aa 90 00 00 54E0:FF AØ FF AØ 00 ØF AØ 75 5088:00 AØ ØØ ØØ AØ ØØ 00 00 00 00 00 00 00 29 52B8:00 00 00 00 00 00 00 00 54E8:00 00 5090:00 aa aa 00 00 00 00 52CØ:00 00 00 00 00 A8 00 66 54F0:00 00 00 00 85 5098:AA aa 00 00 00 00 52C8:00 A0 00 00 A8 00 00 AA 54F8:00 00 00 00 00 00 00 AA 00 39 AT 5500:00 00 50A0:00 aa aa 00 AA 00 00 AA 41 52D0:00 00 2A 40 00 0A 50 00 87 00 gg gg gg gg AA 50A8:00 00 A8 00 00 00 00 00 5508:00 00 00 00 ØA FØ 00 5E 52D8:02 54 00 01 00 50B0:00 00 00 00 00 00 00 52E0:C0 00 05 F0 FC 00 93 A8 55 FF aa 51 01 5510:45 FC FC 2A 50B8:00 aa aa aa aa ar 96 aa aa 00 00 00 59 52E8:00 FF 00 00 5518:A8 14 3F AØ 14 ØF AØ 14 40 50C0:00 00 00 00 00 00 00 00 61 52F0:00 00 03 00 aa 5520:0F AØ 14 ØF 50C8:00 00 00 00 00 00 00 00 69 52F8:00 00 00 00 00 00 00 00 90 FF 2A 41 FC 5528:55 3F 2A 50D0:00 aa aa 00 aa 00 00 00 71 5300:00 00 00 00 00 00 00 00 A6 5530:0A 00 FØ ØØ 00 00 00 00 FD Oa 50D8:2A 00 aa 5538:00 AA 40 A8 40 5308:00 00 00 00 ØA 2A 00 00 00 00 00 aa E2 50E0:00 20 00 00 00 40 00 00 91 5310:55 FC 2A 55 FC AA 40 3 F 8D 5540:00 00 00 00 aa 00 00 00 EA 50E8:00 00 aa aa aa 00 00 00 89 5318:A2 50 0F A0 54 OF AO 15 45 5548:00 00 00 00 0A 55 F0 2A A4 50F0:00 00 00 aa aa aa aa aa 91 5320:0F A0 05 CF 01 555Ø:55 FC AØ FF A8 C5 AA 55 FC A8 15 3F 83 50F8:00 00 00 aa 030 aa 99 aa aa 5328:00 FF 2A 55 HH 55 EC 5558:A8 AØ ØF AØ 14 80 3F 5100:00 00 00 ØØ 00 ØØ 00 00 5330:0A 55 F0 00 00 00 00 00 4F A2 5560:0F 14 ØF A8 14 3F AA 5108:00 00 OG 00 00 00 00 00 5338:00 00 00 00 00 00 00 00 85 5568:54 FC 2A 50 FC AA 2A 5110:00 00 aa aa aa aa 00 00 B2 5340:00 00 00 00 aa 0.0 aa aa 5570:0A FØ 00 00 00 aa 4E 5118:80 00 03 AØ 00 GF 2A 55 4B 5348:00 00 00 00 00 00 ØF 00 00 5578:00 00 00 00 00 00 00 00 5120:FC FØ 00 00 00 0F ØA 55 00 aa 00 7D 5350:00 OF 00 00 OF 42 5580:00 00 00 00 00 00 00 5128:00 00 00 00 00 00 00 5358:AA 55 FF 55 FF 55 A9 00 00 CA AA AA 5588:00 00 00 5130:00 00 00 00 00 00 00 D2 5360:FF 28 00 OF 08 00 0F 08 68 aa aa 00 00 00 5590:00 00 5138:00 00 00 5368:00 0F 00 00 0F 00 00 0F 00 00 00 00 00 DA 5598: ØA FØ ØA FØ ØA 41 7A 41 41 5140:00 5370:00 00 00 00 00 00 00 00 00 00 00 00 E2 00 00 55A0:F0 00 00 00 OG 00 00 5148:00 00 00 00 00 5378:00 00 00 00 00 00 00 00 53 00 00 00 00 00 00 EA 55A8:00 5150:00 00 00 00 00 00 00 00 F2 5380:00 00 00 00 00 00 00 55B0:00 00 00 00 00 00 00 5B 5158:00 00 00 ØA 55 FØ 55 5388:00 00 00 00 ØA 40 ØF 2A 2A B3 55B8:00 00 00 00 00 63 5390:50 ØF 2A 50 ØF 54 ØF AA 48 5160:FC AØ aa OF 80 00 03 00 A4 55C0:00 00 5168:00 00 00 5398:A8 15 ØF AØ 15 ØF AØ Ø5 EF 00 00 aa gg gg gB 55C8:00 00 00 00 00 00 00 00 73 5170:00 00 53A0:0F A0 05 CF AØ 01 A8 aa aa aa aa aa aa 55D0:00 00 00 00 00 00 00 00 13 53A8:01 FF A8 01 FF 2A aa FF 90 5178:00 00 00 00 ØØ 00 00 00 55D8: ØA FC ØA 41 41 FØ 41 53B0:2A 00 FF 00 00 0F 00 00 A8 5180:00 00 00 00 00 00 00 aa 23 55E0:FC 00 0C 00 00 00 00 CA 53B8:00 00 00 00 00 00 00 00 5188:00 00 10 00 33 10 00 08 75 55E8:00 00 00 00 00 00 00 00 93 5190:10 CØ CØ 02 55 00 76 5300:00 00 00 00 00 00 55F0:00 00 00 00 00 5198:00 53C8:00 00 00 00 0A 01 FØ 2A CF 54 00 2A 55 FØ 00 00 00 00 A3 aa 54 **B**5 55F8:00 51AØ:00 02 55 00 ØA 11 CØ 08 8C 53DØ:45 FC 2A 55 FC A8 55 FE 5600:00 00 00 00 00 00 00 AC 53D8:A8 14 3F 14 OF 14 51A8:10 CØ 10 aa aa 10 00 AØ 5608:00 00 00 00 ØA 40 aa 2A A4 51B0:00 00 00 00 53E0:0F A0 14 0F A8 00 3F A8 aa aa aa A8 54 00 00 53 5610:50 00 2A 50 00 51B8:00 00 00 00 00 00 00 5B 53E8:00 3F 28 00 3F 2A 00 5618:A8 14 00 A0 14 00 A0 14 1E 5100:00 00 00 00 00 00 00 63 53F0:0A 00 FC 00 00 14 00 A8 15 CF A8 5620:00 A0 5108:00 00 53F8:00 00 00 00 00 00 00 00 aa aa aa aa 00 00 6B 5628:15 2A 00 00 51DØ:14 ØØ 00 00 5400:00 00 00 00 00 00 00 00 A8 14 00 14 00 E6 5630:0A 00 00 00 00 00 00 00 E1 51D8:00 14 00 ØA 55 FØ 5408:00 00 05 00 00 05 00 ØA 55 AA F8 5638:00 00 00 00 00 00 00 00 E4 51E0:F0 00 14 aa aa 74 00 aa CE 5410:55 FF AA 55 55 FF 5640:00 00 00 00 00 00 EC 51E8:14 00 00 00 5418:A8 Ø5 ØØ 05 00 14 00 14 00 FE 2A 2A 05 5648:00 00 00 OF 00 00 FF 00 E5 00 51F0:00 ØØ aa aa 00 00 00 93 5420:00 0A 45 00 ØA 00 02 45 5650:05 FF 00 55 F0 0A 55 C0 EF 51F8:00 00 aa 55 00 aa aa 00 aa 9B 5428:55 00 02 5658:AA AA CØ 01 5200:00 00 00 00 5430:00 55 00 00 00 00 00 00 00 aa aa A4 15 5660:C0 AA 01 CØ AA 51 CØ ØA 6A 5208:00 aa 00 00 00 aa aa aa 5438:00 00 00 00 00 00 55 FØ ØØ Ø5 FF D6 AC 5668:55 CØ ØØ 00 5210:00 00 90 aa 00 00 00 00 B4 5440:00 00 00 00 00 00 5670:00 00 0F 00 00 59 00 00 5218:00 00 5448:00 00 01 FC 00 01 FF 00 01 65 CØ AØ 05 F0 A0 B8 5678:00 00 00 00 00 00 00 00 25 5220:F3 5450:15 FC A0 15 54 3F 00 99 C9 00 aa aa ØØ CA FC AØ 5680:00 00 00 00 00 00 00 00 2D 5228:00 aa 5458:A0 54 3F AØ 50 AØ A8 aa 00 00 00 00 00 ØA 41 FC 5230:00 00 00 00 00 90 5460:0F A0 50 0F A0 50 3F AØ 19 5690:41 55 3F AØ 14 ØF FA aa aa FF AG 5468:50 3F AA 50 5238:00 00 00 00 00 00 00 ØØ DC 3F AA 50 FC A5 5698:A0 ØF AØ 14 ØF AØ 14 B8 14 00 5470:AA 50 FC 00 00 00 5240:00 aa aa aa 00 00 00 00 E4 56A0:0F AØ 14 AØ 14 ØF AØ 84 5248:00 00 5478:00 00 00 00 00 00 00 00 21 55 FF 55 FF aa 00 00 03 00 00 EC 56A8:14 AA 5250:14 00 00 5480:00 00 00 00 00 00 00 00 56B0:A0 00 0F A0 00 0F 00 00 D5 14 00 00 14 00 68 5258:00 14 00 5488:00 00 00 00 ØA aa aa aa 56B8:00 00 00 00 00 00 00 65 14 14 R6 5490:05 FC 2A 05 FC 15 FF 45 5260:00 aa 14 aa aa 14 00 D7 AR 5600:00 00 00 00 00 00 00 6D 5268:14 00 00 14 00 00 14 aa 80 5498:A8 15 3F AØ 14 ØF AØ 14 FE 56C8:00 0A 00 F0 2A 01 FC 2A 80 54A0:0F A0 14 0F A8 3F 29 14 A8 5270:00 00 00 00 00 00 00 00 15 56D0:00 FC A8 00 3F A8 00 3F AD 54A8:54 3F 2A 55 FF 2A FC 5278:00 00 00 00 00 00 00 OB 1D 56D8:AØ AØ ØF AG 5280:00 00 00 00 00 aa aa aa 25 54BØ: ØA 55 FØ ØØ ØØ ØØ ØØ ØØ D1 56E0:0F A8 00 3F A8 ØØ RF A8 9F 54B8:00 00 00 00 00 00 00 00 61 5288:00 00 00 00 00 00 00 00 2D 56E8:00 3F 2A 00 FC 2A 55 FC E2 5400:00 00 00 00 00 00 5290:00 00 00 00 00 00 00 00 35 00 00 69 56F0:0A 55 F0 02 55 C0 00 00 E3 54C8:00 00 00 00 A0 00 00 AA 21 C4 5298:00 00 3C 00 00 FF 00 aa 56F8:00 00 00 00 00 00 00 00 A5

| 5700:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | AE       | 5930:A0            | 00 | ØF       | AØ       | 00       | ØF   | 00  | ØØ       | 5B       |
|--------------------|----------|-----|----|----------|------|-----|----------|----------|--------------------|----|----------|----------|----------|------|-----|----------|----------|
| 5708:00            |          | 55  | 00 | ØA       | 55   | FØ  | 2A       | 13       | 5938:00            | 00 | 00       | 00       | 00       | 00   | 00  | 00       | EA       |
| 5710:55            | FC       | 2A  | 41 | FC       | A8   | 00  | 3F       | CB       | 5940:00            | 00 | 00       | 00       | 00       | 00   | 00  | 00       | F2       |
| 5718:A8            | 00       | 3F  | AØ | 00       | ØF   | AØ  | 00       | 8A       | 5948:00            | 00 | 00       | ØF       | AA       | 55   | FF  | AA       | 41       |
| 5720:0F            | AØ       | 00  | ØF | AØ       | 00   | ØF  | AA       | 3D       | 5950:55            | FF | 2A       | 55       | FF       | ØA   | 40  | ØØ       | FØ       |
| 5728:55            | FF       | AA  | 55 | FF       | AA   | 55  | FF       | 81       | 5958:02            | 40 | 00       | 02       | 50       | 00   | 00  | 54       | 13       |
| 5730:A0            |          | ØF  | AØ | 00       | ØF   | 00  | 00       | 57       | 5960:00            | 02 | 54       | 00       | 02       | 50   | ØØ  | ØA       | 79       |
| 5738:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | E6       | 5968:40            | 00 | 2A       | 55       | FF       | AA   | 55  | FF       | 2B       |
| 5740:00            |          | 00  | 00 | 00       | 00   | 00  | 00       | EE       | 5970:AA            | 55 | FF       | 00       | ØØ       | ØF   | 00  | ØØ       | ØA       |
| 5748:00            |          | 00  | 3F | A8       | 00   | 3F  | AØ       | 79       | 5978:00            | 00 | 00       | 00       | ØØ       | 00   | ØØ  | ØØ       | 2B       |
| 5750:00            | ØF       | AØ  | 55 | ØF       | AØ   | 55  | ØF       | EØ       | 5980:00            | 00 | 00       | ØØ       | ØØ       | ØØ   | ØØ  | ØØ       | 33       |
| 5758:A0            | 14       | ØF  | AØ | 14       | ØF   | AØ  | 14       | 7A       | 5988:00            | AA | 55       | FF       | AA       | 55   | FF  | AA       | E5       |
| 5760:0F            | AØ       | 14  | ØF | AØ       | 14   | ØF  | AØ       | 46       | 5990:55            | FF | AØ       | 00       | FC       | AØ   | 01  | FØ       | 5F       |
| 5768:14            | ØF       | AA  | 55 | FF       | AA   | 55  | FF       | E4       | 5998:00            | 05 | CØ       | 00       | 15       | 00   | 00  | 54       | Al       |
| 5770:A0            | 00       | ØF  | AØ | 00       | ØF   | 00  | 00       | 97       | 59A0:00            | 02 | 50       | 00       | ØA       | 40   | 00  | 2A       | 59       |
| 5778:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | 27       | 59A8:55            | FF | AA       | 55       | FF       | AA   | 55  | FF       | 06       |
| 5780:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | 2F       | 59BØ:00            | 00 | ØF       | 00       | 00       | ØF   | 00  | ØØ       | 81       |
| 5788:00            | A8       | 00  | 00 | A8       | 00   | 00  | AØ       | 47       | 59B8:00            | 00 | 00       | 00       | 00       | 00   | 00  | 00       | 6B       |
| 5790:00            | 00       | AØ  | 55 | 00       | AØ   | 55  | 00       | D5       | 5900:00            | 00 | 00       | 00       | 00       | 00   | 00  | 00       | 73       |
| 5798:A0            | 14       | 00  | AØ | 14       | 00   | AØ  | 14       | 9C       | 5908:00            | ØA | 55       | FØ       | 2A       | 55   | FC  | 2A       | 82       |
| 57AØ:00            | AØ       | 14  | 00 | AØ       | 14   | ØF  | AØ       | ØE       | 59DØ:55            | FC | A8       | 00       | 3F       | A8   | 00  | 3F       | 5E       |
| 57A8:14            | ØF       | AA  | 55 | FF       | AA   | 55  | FF       | 25       | 59D8:AØ            | 00 | ØF       | AØ       | 00       | ØF   | AØ  | 00       | 45       |
| 57BØ:AØ            | 00       | ØF  | AØ | 00       | ØF   | 00  | 00       | D7       | 59E0:0F            | AØ | 00       | ØF       | AØ       | 00   | ØF  | A8       | FF       |
| 57B8:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | 67       | 59E8:00            | 3F | 28       | 00       | 3C       | 2A   | 5.5 | FC       | A2       |
| 5700:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | 6F       | 59FØ: ØA           | 55 | FØ       | 02       | 55       | CØ   | 00  | 00       | E9       |
| 5708:00            | ØA       | 05  | FC | 2A.      | 05   | CC  | 2A       | 93       | 59F8:00            | 00 | 00       | 00       | 00       | 00   | 00  | 00       | AB       |
| 57DØ:05            | FØ       | A8  | 05 | FC       | A8   | 05  | 3F       | 77       | 5A00:00            | 00 | 00       | 00       | 00       | 00   | 00  | 00       | B4       |
| 57D8:AØ            | 05       | 3F  | AØ | 00       | ØF   | AØ  | 00       | 88       | 5AØ8:00            | ØA | 50       | 00       | 2A       | 54   | 00  | 2A       | 16       |
| 57EØ: ØF           | A8       | 00  | 3F | A8       | 00   | 3F  | A8       | Al       | 5A10:54            | 00 | AA       | 55       | 00       | A8   | 15  | 00       | 66       |
| 57E8:00            | 3F       | 2A  | 00 | FC       | 2A   | 55  | FC       | E4       | 5A18:AØ            | 05 | 00       | AØ       | 05       | 00   | AØ  | 05       | D6       |
| 57F0: ØA           | 55       | FØ  | 02 | 55       | CØ   | 00  | 00       | E5       | 5A20:00            | AØ | 05       | 00       | AØ       | 05   | 00  | AØ       | 57       |
| 57F8:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | A7       | 5A28:05            | 00 | AA       | 55       | FF       | AA   | 55  | FF       | 5F       |
| 5800:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | BØ       | 5A30:A0            | ØØ | ØF       | AØ       | 00       | ØF   | 00  | 00       | 5D       |
| 5808:00            | AØ       | 00  | ØF | AØ       | 00   | ØF  | AA       | 9F       | 5A38:00            | 00 | 00       | ØØ       | 00       | ØØ   | 00  | 00       | EC       |
| 5810:55            | FF       | AA  | 55 | FF       | AA   | 55  | FF       | 6B       | 5A40:00            | 00 | 00       | 00       | ØØ       | 00   | 00  | 00       | F4       |
| 5818:AØ            | 14       | ØF  | AØ | 14       | ØØ   | ØØ  | 14       | BE       | 5A48:00            | ØA | 55       | C3       | 2A       | 55   | FF  | 2A       | 37       |
| 5820:00            | AØ       | 14  | 00 | AØ       | 14   | ØF  | AA       | 99       | 5A50:55            | FC | A8       | 00       | FF       | 8A   | 01  | FF       | A8       |
| 5828:55            | FF       | AA  | 55 | FF       | AA   | 55  | FF       | 83       | 5A58:AØ            | Øl | CF       | AØ       | 00       | ØF   | AØ  | 00       | 1F       |
| 5830:A0            | 00       | ØF  | AØ | 00       | ØF   | 00  | 00       | 59       | 5A60:0F            | AØ | 00       | ØF       | AØ       | 00   | ØF  | A8       | 81       |
| 5838:00            | 00       | 00  | 00 | 00       | 00   | ØØ  | 00       | E8       | 5A68:00            | 3F | 28       | 00       | 3C       | 2A   | 55  | FC       | 24       |
| 5840:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | FØ       | 5A70:0A            | 55 | FØ       | 02       | 55       | CØ   | 00  | 00       | 6B       |
| 5848:00            | A8       | 00  | 3F | A8       | 00   | 3F  | AØ       | 7B       | 5A78:00            | 00 | 00       | 00       | 00       | 00   | 00  | 00       | 2D       |
| 5850:00            | ØF       | AØ  | 00 | ØF       | AØ   | 00  | ØF       | E2       | 5A80:00            | 00 | 00       | 00       | 00       | 00   | 00  | 00       | 35       |
| 5858:AØ            | 00       | ØF  | AA | 55       | FF   | AA  | 55       | 3B       | 5A88:00            | 00 | 00       | ØF       | ØA       | 40   | ØF  | 2A       | C7       |
| 5860:FF            | AA       | 55  | FF | AØ       | 00   | ØF  | AØ       | 2A       | 5A90:50            | 3F | AA       | 50       | 3C       | AØ   | 14  | FC       | 21       |
| 5868:00            | ØF       | AØ  | 00 | ØF       | AØ   | 00  | ØF       | FA       | 5A98:AØ            | 14 | FØ       | AØ       | 15       | FØ   | AØ  | 15       | 8D       |
| 5870:A8            | 00       | 3F  | A8 | 00       | 3F   | 00  | 00       | E4       | 5AAØ:CØ            | AØ | 15       | CØ       | AØ       | 15   | 00  | AØ       | 86       |
| 5878:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | 29       | 5AA8:15            | 00 | AA       | 55       | FF       | AA   | 55  | FF       | E7       |
| 5880:00            | 00       | 00  | 00 | 00       | 00   | 00  | 00       | 31       | 5ABØ:AØ            | 00 | ØF       | AØ       | 00       | ØF   | 00  | 00       | DD       |
| 5888:00            | A8       | 00  | 00 | A8       | 00   | 00  | AØ       | 49       | 5AB8:00            | 00 | 00       | 00       | ØØ       | 00   | 00  | 00       | 6D       |
| 5890:00<br>5898:AA | 55       | AØ  | 00 | 00       | AA   | 55  | FØ       | 9B       | 5ACØ:00            | 00 | 00       | 00       | ØØ       | ØØ   | 00  | 00       | 75       |
|                    |          | FC  | AA | 55       | FF   | AØ  | 00       | 2A       | 5AC8:00            | 00 | 00       | 00       | ØA       | Ø1   | FØ  | 2A       | DD       |
| 58AØ:3F            |          |     | ØF |          | 00   |     | A8       |          | 5ADØ:05            |    | 2A       | 05       |          | A8   | 15  | 3F       | DØ       |
| 58A8:00            |          | A8  | 00 | ØF       | 00   | 14  | 3F       | 12       | 5AD8:A8            | 14 | ØF       | AØ       | 14       | ØF   | AØ  | 14       | 05       |
| 58BØ:00            | 15       | FC  |    | 15       | FØ   | 00  | 00       | B2       |                    | AØ | 14       | ØF       | A8       | 14   | ØF  | A8       | 15       |
| 58B8:00<br>58C0:00 | 00       | 00  | 00 | 00       | 99   | ØØ  | 00       | 69       | 5AE8:54            | 3F | 2A       | 50       | 3F       | 2A   | 50  | FC       | 22       |
|                    | 00       | 00  |    | 00       |      | ØØ  | 00       | 71       | 5AFØ: ØA           | 40 | FC       | 00       | 00       | 00   | 00  | ØØ       | 5A       |
| 58C8:00            | AØ       | 00  | ØF | A8       | 00   | ØF  | A8       | 9E       | 5AF8:00            | 00 | 00       | 00       | 00       | 00   | 00  | 00       | AD       |
| 58DØ:00            | 3F       | 2A  | 00 | 3C       | ØA   | 00  | FC       | 9D       | 5B00:00            | 00 | 00       | 00       | 00       | 00   | 00  | 00       | B6       |
| 58D8:0A            | 40       | FØ  | 02 | 51       | FØ   | 02  | 55       | 84       | 5B08:00            | A8 | 00       | 00       | A8       | 00   | 00  | AØ       | CE       |
| 58E0:C0            | 00       | 55  | CØ | 00       | 55   | 00  | 00       | FD 24    | 5B10:00            | 00 | AØ       | 00       | 00       | AØ   | 00  | ØF       | 6C       |
| 58E8:15            | 00       | AA  |    | FF       | AA   | 55  | FF       | 24       | 5B18:A0<br>5B20:FF | 00 | ØF<br>55 | AA<br>FF | 55       | FF   | AA  | 55       | Øl       |
| 58F0:A0            | 99       | ØF  |    | 00       | ØF   |     | 00       | 1A       | 5B20:FF<br>5B28:00 | AA | AØ       | 00       | AØ       | ØØ . | ØF  |          | EF<br>39 |
| 58F8:00            | 00       | 00  | 00 | 00       | 00   | 00  |          | A9       | 5B30:A8            | 00 | ØØ       | A8       |          | 00   | 00  |          |          |
| 5900:00            |          | 00  |    | 00       | 00   | 00  |          | B2       | 5B30:A0            | 00 | 00       | 00       | 00       | 00   | 00  |          | C5       |
| 5908:00            | 00       | 00  |    | ØØ<br>ØF | 00   | 3F  | ØØ<br>ØF | 2D<br>ØE |                    | 00 | 00       |          |          |      |     | 00       | EE       |
| 5910:00            | ØF<br>ØØ | ØF  | 00 | 00       | ØF   | 00  |          | E8       | 5B40:00<br>5B48:00 | AA | 55       | 00       | 00       | 90   | ØØ  |          | F6       |
| 5918:00<br>5920:0F |          | 00  |    | AØ       | 00   |     | AA       |          | 5B48:00<br>5B50:55 |    | AØ       | CØ       | AA<br>3C | 55   | FØ  | AA<br>3F | 97       |
| 5928:55            |          |     | 55 |          |      | 55  |          |          |                    | 00 | ØF       | 00       |          | ØF   | 00  | 00       | 2D       |
| G-34 C             |          |     |    |          |      |     | - T      |          | 323.00             |    | **       | 20       |          | ~ ~  | 00  | 00       | 20       |
| 17-50              | PHART    | JIE | NO | / EIVIE  | DELL | 333 |          |          |                    |    |          |          |          |      |     |          |          |

5B60:0F 00 00 0F 00 00 3F A0 AE 5B68:00 3C AA 55 FC AA 55 F0 07 5B70:AA 55 CØ ØØ ØØ ØØ ØØ ØØ E9 5B78:00 00 00 00 00 00 00 00 2F 5B80:00 00 00 00 00 00 00 00 5B88:00 A0 00 00 AA 40 00 AA 68 5B90:54 00 AA 55 C0 00 55 FC C9 5B98:00 05 FF 00 00 FF 00 90 5BA0:3F 00 00 FF 00 05 FF 00 0B 5BA8:55 FC AA 55 CØ AA 54 ØØ 4D 5BBØ: AA 40 00 A0 00 00 00 00 D6 5BB8:00 00 00 00 00 00 00 00 6F 5BC0:00 00 00 00 00 00 00 00 77 5BC8:00 A0 00 00 AA 55 FF AA FC 5BDØ:55 FF AA 55 FC AØ 01 FØ 3A 5BD8:00 05 C0 00 15 CØ ØØ 15 A9 5BE0:00 00 05 C0 00 01 C0 A0 6A 5BE8:01 F0 AA 55 FC 55 FF 44 5BFØ: AA 55 FF AØ ØØ ØØ ØØ ØØ 5C 5BF8:00 00 00 00 00 00 00 00 AF 5000:00 00 00 00 00 00 00 00 5C08:00 A0 00 0F A8 00 0F A8 E5 5C10:00 0F 2A 00 3C 0A 40 FC 59 5C18:02 51 FØ ØØ 55 00 CØ 07 5C20:00 00 15 00 00 55 C0 02 54 5C28:51 FØ ØA 40 FC 2A ØØ 3F DA 5C30:A8 00 0F A0 00 ØF 00 00 65 5C38:00 00 00 00 00 00 00 00 F0 5C40:00 00 00 00 00 00 00 00 F8 5C48:00 00 00 00 AØ 00 00 A8 AE 5C50:00 00 2A 00 00 0A 40 0F 06 5C58:02 50 0F 00 55 FF 00 15 C7 5C60:FF 00 15 FF 00 54 0F 02 2D 5C68:50 OF 0A 40 00 2A 00 00 FA 5C70:A8 00 00 A0 00 00 00 00 87 5C78:00 00 00 00 00 00 00 00 31 5C80:00 00 00 00 00 00 00 00 39 5C88:00 A8 00 FF AA 00 FF AA 6B 5C90:00 0F A2 40 0F A2 40 0F F7 5C98:AØ 5Ø ØF AØ 5Ø ØF AØ 14 5CA0:0F A0 14 0F A0 05 0F A0 54 5CA8:05 0F A0 01 CF A0 01 FF CE 5CBØ: AA ØØ FF AA ØØ 3F 00 00 66 5CB8:00 00 00 00 00 00 00 00 71 5CC0:00 00 00 00 00 00 00 00 79

#### VERTISCROLL

- MS 10 REM COPYRIGHT 1993 COM
  PUTE PUBLICATIONS INTL L
  TD ALL RIGHTS RESERVED
  PX 20 IF A=0THENA=1:LOAD"VS.CO
- DE",8,1 DH 30 IF B=0THENB=1:LOAD"VS.LE
- DH 30 IF B=0THENB=1:LOAD"VS.LE TTERS",8,1
- DG 40 S=16928:E=17407
- BE 50 PRINT"{CLR}{3 DOWN}{WHT} {4 SPACES}VERTISCROLL -{SPACE}SCROLL TEXT EDITO R"
- QH 60 PRINT"{3 DOWN} PRESS SPA CE TO ENTER THE TEXT EDI TOR."
- RC 70 PRINT"{DOWN} YOU CAN USE 12 LINES MAXIMUM."
- KS 80 PRINT"{DOWN} PLEASE TYPE
  AN @ AT THE END OF YOUR
  QS 90 PRINT"{DOWN} TEXT AND PR
- ESS RETURN TO STORE."
  FP 100 GET AS:IF AS<>" "THEN10

MX 110 PRINT" {CLR}"; : OPEN 1,0: INPUT#1, T\$: CLOSE1 DB 120 FOR X=1024 TO 1503: POKE S+X-1024, PEEK(X): POKE {SPACE}X,42:NEXT AM 130 PRINT" {CLR} {3 DOWN} PRES S SPACE TO SEE YOUR VER TISCROLL." EQ 140 GET AS: IF AS<>" "THEN14 FX 150 SYS16384 JC 160 PRINT"{CLR}{3 DOWN}PRES S 'S' TO SAVE, OR 'E' T O EDIT." SE 170 GET K\$: IFK\$=""THEN170 QA 180 IF K\$="E"THEN SYS 16387 :GOTO40 PF 190 SYS16387 RR 200 INPUT"{2 DOWN}SAVE FILE NAME"; F\$ JP 210 FS="@0:"+FS:OPEN1,8,1,F \$: POKE 252, S/256: POKE 251 ,S-PEEK (252) \* 256 XM 220 POKE782, E/256: POKE781, E -PEEK (782) \*256: POKE780, 251:SYS65496:CLOSE1 JB 230 PRINT" {7}" CH 240 IF ST<>0THEN PRINT" {2 DOWN}ERROR DURING SA VE!": END

Daniel English is a frequent contributor. He hopes someday to open his own business to create and distribute software for the 64 and Amiga. He lives in Moreno Valley, California.

#### **EASY DOES IT**

By Hugh Rountree

Erasable programmable read only memory, better known as EPROM, is a great concept. It lets you load your favorite programs onto a cartridge that plugs into your 64 or 128, and these programs are instantly available whenever you boot your computer. Whatever is stored in an EPROM chip acts like regular ROM, but you can erase the chip and refill it with other programs whenever you wish.

I purchased a Promenade C1 EPROM programming device about six or seven years ago from the Jason-Ranheim Company, but I'll have to confess that I've used it very little until recently. There are two main reasons for this.

First of all, Motorola's EPROM 68766, the 24-pin 8K × 8-bit version of the 2764 found in early Commodores, was priced at five times the cost of the 2764 original. The Motorola chip was the only EPROM that would exactly replace the ROM IC's

used in Commodore's early computers and disk drives.

Second, the original Promos software that came with Promenade was for experienced programmers. It was complicated to use. You had to swap back and forth from the Promos' BASIC environment to a machine language monitor such as Micromon, Supermon, or Hesmon.

During the past several years, however, the price of the 68766 has dropped from approximately \$25.00 to less than \$5.00 each. The last ones that I purchased from Jameco cost \$4.75 each. So now I can afford to program all of the EPROMs that I wish for all of my Commodore equipment.

In contacting Jason-Ranheim, I learned that they now have a version 2 of Promos, which has many added commands, including most of those found in a ML monitor. Also Promos had been altered so that you can enter manual commands with hexadecimal numbers instead of decimal. Another improvement is that commands can be executed from within a BASIC program using integer variables, which of course work only with decimal numbers.

Since I prefer entry in hex instead of decimal, that meant I had to use a hex-to-decimal conversion routine. So when I got the new Promos software, I began writing Easy Does It to augment the superb qualities of Promos V2.0.

Typing It In

Easy Does It is written entirely in BA-SIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you attempt to run it. I have also included a boot program that will automatically load and run Easy Does It and Promos. Make sure that all of these programs are on the same disk.

When Easy Does It loads Promos, you'll see the following menu.

Zero Socket—Z
Fill Memory(Zero)—F
Check Eprom/Erasure—E
Load Disk File—L
Save Disk File—S
Set Eprom PaRAMeter—P
Set Ram Addresses—ADD

Read Eprom—R Write Eprom—W Write Eprom/Verify—VER Verify Eprom/Ram—V ? h

If you notice, the letter H appears beneath the cursor. If you hit the Return key with the H showing, you'll find yourself viewing an auxiliary help screen. It looks something like the following.

COMMAND ADDENDUM

(M/I/D/A/C/T)

TOGGLE (CHECKSUM OFF)

Each letter is a different command to enter. These commands are similar to those found in ML Monitors such as Supermon or Micromon. M is the memory command used to view the hex value of memory addresses.

I displays the ASCII value of these same addresses.

D for data lets you view the hex value of addresses read directly from an EPROM installed in the Promenade socket.

A displays the ASCII value of these EPROM addresses.

C lets you compare one range of RAM addresses to another range.

T transfers the data from one RAM address range to another.

Toggle will in effect enable the checksum and hash total reporting built into Promos. This feature is normally lost when Promos commands are executed from BASIC.

Be careful using the Toggle command because it works by taking the computer out of BASIC mode and putting it into manual mode. If you have a DOS wedge installed with Promos and operate a BASIC program in manual mode, should you inadvertently enter a wedge command from the keyboard, the DOS command may respond with disastrous results. I have had a whole disk directory scrambled by inadvertent-

**Using Easy Does It** 

Easy Does It makes it no longer necessary to figure out and enter the correct

ly entering a DOS command in these cir-

cumstances. I recommend operating in

Checksum Off mode when possible.

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control word or program method numbers. They are automatically selected from a built-in database within the program. All that is required for automatic selection of these values is entry of the program voltage and the EPROM type.

When you enter a *P* to set EPROM parameters, you will be asked to enter the voltage, EPROM type, and also the EPROM start address. The EPROM end address will be automatically set for the last byte of the EPROM itself. The RAM hex start and end addresses control how many bytes will be programmed, which you are asked to enter upon entry of the Add command or Set RAM Addresses.

The Zero Socket command, Z, sets all pins of the EPROM socket to 0 voltage. The Fill Memory command, F, fills the memory address range between the RAM hex start address and the RAM hex end address. The Check EPROM/Erasure command, E, checks to see if the EPROM is in an erased state (all FF) from the EPROM start address to the EPROM end address.

The Load Disk File command, L, will load a disk file with the specified filename to RAM beginning at the RAM hex start address. The Save Disk File will save RAM contents beginning with the RAM hex start address and ending with the RAM hex end address. If you enter any disk file commands accidentally, you may return to the menu by pressing Return on a blank filename.

The Read EPROM command, R, reads data from the EPROM start address to RAM beginning at the RAM hex start address and ending at the RAM hex end address.

The Write EPROM command, W, programs an EPROM beginning at the EPROM start address with code beginning at the RAM hex start address and ending at the RAM hex end address. The Write EPROM/Verify command, VER, first performs an Erasure, E, command, and then if it passes this command, it begins a W command. After this command finishes, it then does a V command.

The Verify EPROM/RAM command, V, verifies that the code in the EPROM beginning at the EPROM start address is identical with code beginning with the RAM hex start address and ending with the RAM hex end address.

Once entered, all of the data except for the main menu input and the filename inputs will stay with the last entered value. Simply press Return to retain the earlier data at the appropriate prompt

I could have created a much longer BASIC program with more features, but I decided that it was best to keep it as short as possible and leave a larger RAM buffer for use in holding code for programming EPROMs. Jason-Ranheim advises leaving 14K of RAM for the BASIC program. Warning: Promos V2.0 will not allow disk file saves above \$CFFF

Upon running, Easy Does It sheds a little excess baggage by deleting the first seven lines (10–70) of the program when they execute. Otherwise, the program would give an *OUT OF MEMORY* error message and refuse to run before all of the variables were executed. The first 70 lines are REM statements for information on the program, creating the RAM buffer by moving the top of BASIC down to \$1FFF, filling memory from hex 2000 to hex DFFF with zeros, and finally deleting the first 70 lines, whereupon the program runs again beginning with line 80.

If you own a Promenade EPROM device and don't have the latest Promos V2.0 software with a manual, you may order it for \$29.95 on a 51/4-inch disk or \$32.95 on a 31/2-inch disk. The address is Jason-Ranheim Company, 3105 Gayle Lane, Auburn, California 95602; (800) 421-7731. The company also carries EPROM supplies.

#### BOOT

- PK 5 REM COPYRIGHT 1993 COMP UTE PUBLICATIONS INTL LTD - ALL RIGHTS RESERVED
- QS 10 REM BOOT PROGRAM FOR EAS
  Y DOES IT & PROMOS V2.0
  {SPACE}BY HUGH ROUNTREE
- DF 20 D\$="8":D=PEEK(186):IFD>7 THEND\$=RIGHT\$(STR\$(D),LE N(STR\$(D))-1)
- FR 30 PRINTCHR\$(147):PRINT:PRI NT"LOAD";CHR\$(34);"PB";C HR\$(34);","D\$",1"
- KE 40 FORI=1T09:PRINTCHR\$(13);
  :NEXT:PRINT"POKE56,32:NE
  W":PRINT:PRINT
- CP 50 PRINT"LOAD";CHR\$(34);"EA
  SY DOES IT";CHR\$(34);","
  D\$;CHR\$(19);

KJ 60 FORI=631TO633:READDA:POK EI,DA:NEXTI:POKE198,3:NE W:DATA13,13,131

#### **EASY DOES IT**

- KD 10 REM EASY DOES IT BY HUGH ROUNTREE COPYRIGHT 1993 - COMPUTE PUBLICATIONS
- RS 20 REM\*ENABLE PROMOS V2.0 P REVIOUSLY\*LINES 10-70 AU TO-DELETE WHEN PROGRAM R UNS\*
- AA 30 REM\*SET W=1 IN LINE 90 T O DISABLE SOUND TONE\*
- HG 40 PRINTCHR\$(147);"
  {7 SPACES}AUTO-DELETING
  {SPACE}LINES{2 SPACES}10
  -70":PRINT
- PX 50 PRINT"10":PRINT"20":PRIN T"30":PRINT"40":PRINT"50 ":PRINT"60":PRINT"70"
- GR 60 PRINT"F 2000, DFFF, 00:RUN "; CHR\$(19);
- DD 70 FORI=1T08:POKE630+I,13:N EXT:POKE198,8:POKE56,32: END
- HS 80 DIMH(15),W(8,3),PM(8,3), CA(7),A\$(4),D\$(2),R\$(7), X\$(4):FORI=1TO4:READDV(I
- PX 90 NEXT:FORI=1T08:READE\$(I)
  :FORIA=1T03:READW(I,IA),
  PM(I,IA):NEXT:NEXT:W=0
- RR 100 DATA4096,256,16,1,"07FF
  ",42,70,0,0,40,71,"0FFF
  ",226,70,225,7,224,7
- XA 110 DATA"1FFF",6,14,5,14,20 ,14,"3FFF",6,14,5,14,0, 0,"7FFF",230,70,229,70,
- "03FF",0,0,0,0,40,7
  PR 130 TG\$(0)="OFF)":TG\$(1)="
  {SPACE}ON)":IA=48:FORI=
  0TO15:H(I)=I+IA:IFI=9TH
  ENIA=55
- MM 140 NEXT:D\$(1)="COMPARE":D\$
  (2)="TRANSFER":R\$(1)="L
  OW UNERASED BYTE"
- CK 150 R\$(2)="HIGH BYTE LOADED
  ":R\$(3)="HIGH BYTE SAVE
  D":R\$(4)="HIGH BYTE REA
  D"
- FJ 160 R\$(5)="FAIL ADDRESS":R\$
  (6)=R\$(5):R\$(7)=R\$(5)
- XF 170 A\$(1)="START":A\$(2)="EN D":A\$(3)="COMPARE":A\$(4 )="TRANSFER"
- KD 180 C\$(1)="ERASURE":C\$(2)="
  DISK LOAD":C\$(3)="DISK
  {SPACE}SAVE":C\$(4)="REA
  D EPROM"
- AX 190 C\$(5)="WRITE EPROM":C\$(6)="VERIFY EPROM":C\$(7)
  ="COMPARE RAM":S\$="
  {8 SPACES}"

| CD   | 230 | PRINT: PRINTSS"FILL MEMO    |    |
|------|-----|-----------------------------|----|
|      |     | RY(ZERO)> F"                |    |
| EF   | 240 | PRINT: PRINTS\$"CHECK EPR   |    |
| 91   |     | OM/ERASURE-> E"             |    |
| KF   | 250 | PRINT: PRINTS "LOAD DISK    |    |
|      |     | FILE> L"                    |    |
| MA   | 260 | PRINT: PRINTS\$"SAVE DISK   |    |
|      |     | FILE> S"                    |    |
| SC   | 270 | PRINT: PRINTSS"SET EPROM    | 1  |
|      |     | PARAMETER-> P"              |    |
| AG   | 280 | PRINT: PRINTS "SET RAM A    |    |
|      |     | DDRESSES>ADD"               | 1  |
| EC   | 290 | PRINT: PRINTS \$"READ EPRO  |    |
| 10   | 2,0 | M> R <sup>III</sup>         | Ι' |
| EA   | 300 | PRINT: PRINTS "WRITE EPR    | ١, |
| םת   | 300 |                             |    |
| D.C. | 210 |                             | 1  |
| EG   | 310 | PRINT: PRINTS\$"WRITE EPR   | ١. |
|      | 200 | OM/VERIFY>VER"              | ]  |
| BK   | 320 | PRINT: PRINTS \$ "VERIFY EP |    |
|      |     | ROM/RAM> V"                 | ,  |
| FH   | 330 | PRINT: PRINTSS"             |    |
|      |     | {2 SPACES}H{3 LEFT}";:I     | (  |
|      |     | NPUT C\$                    |    |
| FP   | 340 | IFC\$="Z"THENGOSUB540:GO    | 1  |
|      |     | SUB550                      |    |
| PK   | 350 | IFC\$="F"THENGOSUB540:GO    | 1  |
|      |     | SUB830:GOSUB560             |    |
| SE   | 360 | IFC\$="E"THENGOSUB540:CM    |    |
|      |     | =1:GOSUB600:CM=0            |    |
| ВЈ   | 370 | IFC\$="L"THENGOSUB540:CM    | ١. |
| DU   | 310 | =2:GOSUB620:CM=0            | (  |
| an   | 200 |                             | ١. |
| CB   | 380 | IFC\$="S"THENGOSUB540:GO    |    |
|      |     | SUB1380:IFEA<53248THENC     |    |
|      |     | M=3:GOSUB650:CM=0           |    |
| JB   | 390 | IFC\$="P"THENGOSUB540:GO    |    |
|      |     | SUB680                      |    |
| HP   | 400 | IFC\$="ADD"THENGOSUB540:    |    |
|      |     | GOSUB830                    | 1  |
| AR   | 410 | IFC\$="R"THENGOSUB540:CM    |    |
|      |     | =4:GOSUB890:CM=0            |    |
| MJ   | 420 | IFC\$="W"THENGOSUB540:CM    | 1  |
|      |     | =5:GOSUB900:CM=0            |    |
| GP   | 430 | IFC\$="VER"THENGOSUB540:    |    |
|      |     | CM=1:GOSUB910:CM=0          |    |
| ВН   | 440 | IFC\$="V"THENGOSUB540:CM    |    |
| DII  | 110 | =6:GOSUB970:CM=0            |    |
| HE   | 450 | IFCS="H"THENGOSUB540:GO     |    |
| пь   | 450 | SUB980                      |    |
| 20   | 100 |                             | П  |
| RD   | 460 | IFC\$="M"THENGOSUB540:GO    |    |
|      | 470 | SUB1290                     |    |
| PB   | 470 | IFC\$="I"THENGOSUB540:GO    |    |
|      |     | SUB1300                     |    |
| RB   | 480 | IFC\$="D"THENGOSUB540:GO    |    |
|      |     | SUB1310                     |    |
| DB   | 490 | IFC\$="A"THENGOSUB540:GO    |    |
|      |     | SUB1320                     |    |
| DG   | 500 | IFC\$="C"THENGOSUB540:CM    | 1  |
|      |     | =7:GOSUB1350:CM=0           | 1  |
| SJ   | 510 | IFC\$="T"THENGOSUB540:GO    |    |
| 50   | 210 | SUB1370                     | 1  |
|      |     | 5552578                     | 1  |

SK 200 K\$(1) = "PASSED": K\$(2) = "F

AILED":DN%=8:DN=PEEK(18
6):IFDN>7THENDN%=DN
AH 210 PRINTCHR\$(147)CHR\$(14)S
\$\$\$"PROMENADE"

PQ 220 PRINT:PRINTS\$"ZERO SOCK
ET----> Z"

CD 230 PRINT:PRINT\$\$"FILL MEMO

| CD   | E20        | TRAC- IImagar p IImurayaa ayaa                        |
|------|------------|---|
| SR   | 520        | IFC\$="TOGGLE"THENGOSUB5<br>40:GOSUB1400              |
| BC   | 530        | GOTO210   |
| BS   | 540        | PRINTCHR\$(147)CHR\$(142)                             |
| 00   | EEA        | : RETURN<br>Z: RETURN                                 |
| FQ   | 550<br>560 | BY%=0:PRINT"{2 SPACES}E                               |
| - ×  | 300        | NTER VALUE FOR MEMORY F                               |
|      |            | ILL"  |
| EM   | 570        |   |
|      |            | Ø-\$FF) ";:INPUTB\$:L=LEN (B\$):IFL<>2THENGOTO560     |
| MG   | 580        | H\$="ØØ"+B\$:HA=Ø:GOSUB1Ø                             |
|      |            | 40:IFHA<00RHA>255THEN56                               |
| 0.17 | F00        | 0   |
| DF   | 590        | BY%=HA%:F BA%,EA%,BY%:R<br>ETURN                      |
| EX   | 600        | IFEE%=ØORCW%=ØTHENGOSUB                               |
|      |            | 680   |
| JF   | 610        | E ES%, EE%, CW%: GOSUB1220                            |
| но   | 620        | :RETURN<br>IFBA%=ØTHENGOSUB83Ø                        |
| AA   | 630        | GOSUB1000: IFNS=""THENRE                              |
|      |            | TURN  |
| HG   | 640        | L N\$,DN%,BA%:GOSUB1220:                              |
| JE   | 650        | RETURN IFBA%=ØANDEA%=ØTHENGOSU                        |
| 01   | 030        | B830  |
| QR   | 660        | GOSUB1000: IFN\$=""THENRE                             |
|      | 67.0       | TURN  |
| DX   | 670        | S N\$, DN%, BA%, EA%: GOSUB1<br>220: RETURN           |
| QG   | 680        |   |
|      |            | ROGRAM VOLTS (12.5/21/25                              |
|      |            | )":PRINT"{2 SPACES}";:I                               |
| ОТ   | 600        | NPUTV\$<br>IFV\$<>"12.5"ANDV\$<>"21"                  |
| Cu   | 690        | ANDV\$<>"25"THENGOTO68Ø                               |
| RQ   | 700        | PV=1:IFVAL(V\$)>12.5THEN                              |
|      |            | PV=2:IFVAL(V\$)>21THENPV                              |
| VM   | 710        | =3 PRINT:PRINT"{2 SPACES}E                            |
| AM   | 110        | NTER EPROM TYPE (2758/27                              |
|      |            | 16/2732/2764)"  |
| EG   | 720        | PRINT" {2 SPACES} (27128/                             |
|      |            | 27256/27512/68764/68766<br>/68769)"                   |
| JO   | 730        | PRINT"{2 SPACES}";:INPU                               |
|      |            | TP\$:IFP\$="68764"ORP\$="6                            |
|      | 7.0        | 8769"THENP\$="68766"                                  |
| GC   | 740        | OK=1:IFP\$<>"2758"ANDP\$<<br>>"2716"ANDP\$<>"2732"AND |
|      |            | P\$<>"2764"THENOK=Ø                                   |
| QS   | 750        | IFOK=@ANDP\$<>"27128"AND                              |
|      |            | P\$<>"27256"ANDP\$<>"2751                             |
|      |            | 2"ANDP\$<>"68766"THENGOT<br>0710                      |
| SS   | 760        | BT=16:S=1:PRINT"                                      |
|      |            | {2 SPACES}";:L=LEN(P\$):                              |
|      |            | ET=VAL(RIGHT\$(P\$,L-2)):                             |
| ЈН   | 770        | ML=2:GOSUB1130<br>PRINT:IFCW%=0ORPM%=0THE             |
| חט   | 110        | NGOSUB1160:GOTO680                                    |
| HE   | 780        | HS=ES(S):EAS(2)=HS:HA=0                               |
|      |            | :GOSUB1040:MA=HA:EE%=HA                               |
|      |            | %:A1=1:GOSUB790:ES%=HA%                               |

: RETURN

| XM       | 790  | PRINT"{2 SPACES}ENTER E   |
|----------|------|---|
|          |      | PROM "A\$(A1)" ADDRESS":<br>E\$=H\$:IFA1=1THENLA=0:E\$                |
| QK       | 800  |   |
|          |      | \$";E\$(S);") ";:INPUTEA\$ (A1)                                       |
| BD       | 810  | PRINT: H\$=RIGHT\$ ("0000"+<br>EA\$ (A1), 4): HA=0: GOSUB10           |
|          |      | 40:IFHA <laorha>MATHEN79</laorha>                                     |
| MJ<br>AC | 820  | RETURN<br>A1=1:CA=8192:GOSUB840:B                                     |
|          |      | A=HA:BA%=HA%:A1=2:CA=BA<br>:GOSUB84Ø:EA=HA:EA%=HA%                    |
| OF       | 840  | :RETURN PRINT"{2 SPACES}ENTER R                                       |
| QF       | 040  | AM "A\$ (A1) " HEX ADDRESS  |
|          |      | ":X\$=X\$(1):IFA1<>2THENX<br>\$="2000"                                |
| CB       | 850  | PRINT"{2 SPACES}\$"X\$"-\$ DFFF) ";:INPUTX\$(Al):PR                   |
| HG       | 860  | INT<br>L=LEN(X\$(Al)):IFL<>4THE                                       |
| FP       | 870  | N840<br>H\$=X\$(A1):HA=0:GOSUB104                                     |
|          |      | Ø:IFHA <caorha>57343THEN<br/>840</caorha>                             |
| CX       | 880  | RETURN<br>GOSUB930:R BA%,EA%,ES%,                                     |
| RR       |      | CW%:GOSUB1220:RETURN  |
| HA       | 900  | GOSUB930:GOSUB960:RETUR   |
| CC       | 910  | GOSUB600:CM=5:IFCK=2THE<br>N1170                                      |
| XP.      | 920  | GOSUB930:GOSUB960:CM=6:<br>GOSUB970:RETURN                            |
| XE       | 930  | IFBA%=ØOREA%=ØTHENGOSUB<br>830  |
| AA       | 940  | IFCW%=0ORPM%=0THENGOSUB   |
|          | 950  | RETURN  |
| FM       | 960  | P BA%, EA%, ES%, CW%, PM%: G<br>OSUB1220: RETURN                      |
| PF       | 970  | GOSUB930:V BA%, EA%, ES%, CW%:GOSUB1220:RETURN                        |
| QP       | 980  | PRINTS\$"{3 SPACES}COMMA ND{2 SPACES}ADDENDUM":P                      |
|          |      | RINT:PRINT" [7 SPACES] (<br>{SPACE}M / I / D / A /<br>{SPACE}C / T )" |
| FJ       | 990  | {SPACE}C / T )" PRINT:PRINTSS" TOGGLE (                               |
|          |      | CHECKSUM "TG\$(TG):GOTO1  |
| KP       | 1000 | N\$="":PRINT:PRINT" {2 SPACES}ENTER FILENA                            |
| -        | 1010 | ME"   |
| GB       | TOTE | PRINT"{2 SPACES}";:INP  |

P-1:B=16:A=ASC (MID\$ (H\$

UTNS: PRINT: IFNS=""THEN

RETURN

SB 1030 RETURN

DH 1020 IFN\$=","ORN\$="?"ORN\$="
\*"ORN\$="@"ORN\$=";"ORN\$
="."THENGOTO1000

QR 1040 L=LEN(H\$):FORI=LTO1STE

|     |       | EN1060                              | Q  |
|-----|-------|-------------------------------------|----|
| SP  |       | FA=0:IFA<650RA>70THENF              |    |
|     |       | A=1:GOTO1070                        | J  |
| AP  |       |                                     |    |
| FB  | 1070  | NEXTI: IFFATHENFA = 0: HA=          |    |
|     | 1996  | -1:RETURN                           | Н  |
| RP  | 1080  | GOSUB1120: RETURN                   |    |
|     |       | B=B-1:IFH(B)>ATHEN1090              |    |
| XE  | 1100  | GOSUB1110: RETURN                   |    |
|     | 1110  | HA=HA+(B*DV(I)):RETURN              | X  |
| PR  | 1120  | HA%=HA+65536* (HA>32767             | D  |
|     | 1100  | ):RETURN                            |    |
| CK  | 1130  | RE=ET-BT:BT=BT*ML:IFRE              | A  |
|     |       | THENS=S+1: IFS>6THENML=             |    |
|     |       | 1:BT=766:IFS>7THENBT=5              | H  |
|     | 1140  | 8                                   | 1  |
|     | 1140  | IFRETHENGOTO1130                    |    |
| MX  | 1150  | CW%=W(S,PV):PM%=PM(S,P              | F  |
|     | 11.60 | V):ML=2:RETURN                      |    |
| DS  | 1160  | PRINTS\$"SELECTED EPROM             | В  |
|     |       | TYPE AND":PRINTS\$"PGM              | F  |
|     | 1177  | . VOLTAGE NOT VALID."               | p  |
| ER  | 1170  | PRINT: PRINT" [6 SPACES]            | 6  |
|     |       | -PRESS ANY KEY TO CONT              |    |
|     |       | INUE-": PRINT: IFWTHEN12            | th |
| -   | 1100  | 00                                  | 1  |
| F.Ö | 1180  | POKE54296,15:POKE54278              | S  |
|     | 1100  | ,89:POKE54276,33                    | a  |
| AG  | 1190  | POKE54273,34:POKE54272              | S  |
|     |       | ,75:FORI=1T0100:NEXT:P              | 10 |
|     |       | OKE54273,45:POKE54272,              |    |
| MD  | 1200  | 90                                  | 0  |
| KD  | 1200  | GETA\$: IFA\$=""THENONW+1           | a  |
| XG  | 1210  | GOTO1190,1200<br>POKE54296,0:RETURN | T  |
| GH  | 1220  | AD=PEEK(166)+256*PEEK(              | 9  |
| Gn  | 1220  | 167)                                | W  |
| CP  | 1230  | IFPEEK(165) = ØTHENCK=1:            |    |
| CI  | 1230  | IFCM>4THEN1260                      | g  |
| GG  | 1240  | PRINT: IFPEEK (165) = 255T          | č  |
| 00  | 1240  | HENCK=2                             | g  |
| PB  | 1250  | IFCM>lorck=2THENPRINT"              | _  |
| LD  | 1230  | "AD"= ADDRESS OF "R\$(              | th |
|     |       | CM)                                 | ir |
| 00  | 1260  | POKE165,0:POKE166,0:PO              | th |
| 22  | 1200  | KE167,0:IFCM<>4THENPRI              |    |
|     |       | NT"{2 SPACES}"C\$(CM)"              | S  |
|     |       | {SPACE} COMMAND "K\$ (CK)           | E  |
| MJ  | 1270  |                                     |    |
| 110 | 12/0  | CM=5THENRETURN                      | V  |
| KC  | 1280  | GOTO117Ø                            |    |
|     |       | GOSUB830:M BA%, EA%:PRI             | S  |
| 00  | 1230  | NT:GOTO1170                         |    |
| BS  | 1300  | GOSUB830:I BA%, EA%: PRI            | U  |
| DU  | 1300  | NT:GOTO1170                         | To |
| DA  | 1310  | GOSUB1330:D ES%, EE%, CW            | 2  |
| LA  | 1310  | %:GOTO1170                          | th |
| DC  | 1320  | GOSUB1330:A ES%, EE%, CW            |    |
| 10  | 1320  | %:GOTO1170                          | C  |
| ED  | 1330  |                                     | u  |
| EU  | 1330  | PRINT: IFCW%=0THENGOSUB             | S  |
| DA  | 1240  | 11-1.COCUB790.EC\$-U3\$.            | a  |
| DA  | 1340  | Al=1:GOSUB790:ES%=HA%:              | W  |
|     |       | LA=HA:A1=2:GOSUB790:EE              | S  |
| ир  | 1250  | %=HA%:RETURN                        | fr |
|     |       | GOSUB830:CA=8192:LA=57              |    |
|     |       | 343:A1=3:GOSUB840:CT%=              | g  |
|     |       | па                                  | re |
|     |       |                                     |    |

| QM | 1360  | C BA%, EA%, CT%: PRINT: GO |
|----|-------|----------------------------|
|    |       | SUB1220: RETURN            |
| JA | 1370  | GOSUB830:CA=8192:A1=4:     |
|    |       | GOSUB840:CT%=HA%:T BA%     |
|    |       | ,EA%,CT%:PRINT:RETURN      |
| HD | 1380  |                            |
|    |       | {2 SPACES}-DATA SAVE N     |
|    |       | OT ALLOWED ABOVE SCFFF     |
|    |       | -":PRINT:GOSUB1170         |
| XK | 1390  | RETURN                     |
|    | 1400  | TG=TG+1:TG%=128:IFTG>1     |
| -  | 93070 | THENTG=0:TG%=0             |
| AR | 1410  | POKE157, TG%: GOSUB990:R   |
|    |       | ETIIRN                     |

Hugh Rountree lives in Perry, Florida.

#### RAM-D

By Joseph Bolin

RAM-D is a RAM disk program for saving programs under ROM, I/O, and the block of memory at 49152 and recalling them at speeds 80 times faster than a 1541 disk drive. You can use a utility, store it in RAM-D, run another program, and then call back the first one almost instantaneously. There's no waiting for long disk saves and loads.

Just remember that a RAM disk is volatile; it's a temporary storage device. That means you'll lose the data or program should you turn off your computer without first saving it to disk.

RAM-D is written entirely in machine language for the 64. To enter it, use MLX, COMPUTE'S machine language entry program. See "Typing Aids" elsewhere in this section. When MLX asks for the starting and ending address, respond with the following values.

Starting address: 0801 Ending address: 0C88

When you have finished entering it, save a copy to disk before exiting.

Using a RAM Disk

To run RAM-D, load it and enter SYS 2051, DEVICE, AUTOSAVE. Device is the device number of the RAM disk. It can be any device number normally used for a disk drive. Using 1 for Autosave automatically stores in RAM-D any program as it is loaded off a disk. When you access the program for the second time, the program is removed from RAM-D. This keeps the last program that you've accessed from disk ready for reuse in RAM. Enter a 0 to dis-

able this feature.

You can load and save to RAM disk with the normal format, but to scratch files, you must type SAVE"S: FILE-NAME", DEVICE. Filename is the name of the file to be scratched, and device is the device number of the RAM disk. To erase all the files on the RAM disk, type SAVE"N:",DEVICE.

To list the directory, type LOAD"←", DEVICE. This lists the directory to the screen and does not erase the program in memory. You can pause the listing by pressing any control key. This listing provides the number of bytes in each file, the filename, the saved address, and the number of bytes free. With no files in RAM-D, it will report 24K of space for storage.

You can also save a specified area of memory to the RAM disk by typing SAVE"FILENAME", DEVICE, 1, SA, EA. SA is the starting address, and EA the ending address.

You can load a file into a specified area of memory from RAM-D by typing LOAD"FILENAME", DEVICE, 1, LA. LA is the loading address. RAM-D saves the load and save vectors, so the program can be used with TurboDisk and TurboSave if you relocate and load them first.

If you want to enable or disable the automatic saving feature, type *POKE* 3110,1 to enable or *POKE* 3110,0 to disable. To change the device number without erasing the disk, then enter *POKE* 3110, *DEVICE*. To see the gain you get with the automatic saving feature, enable it and load a program off the disk twice.

#### RAM-D

```
0801:00 00 AD 30 03 8D 3F 0C A2
Ø809:AD 31 Ø3 8D 4Ø ØC AD 32 35
Ø811:03 8D 41 0C AD 33 03 8D BC
Ø819:42 ØC A9 77 8D 32 Ø3 A9
                             DE
Ø821:08 8D 33 Ø3 A9 C6 8D 3Ø E2
0829:03 A9 84 85 2B A9 00 8D 9B
Ø831:83 ØE 20 FD AE 20 9E B7
                             55
0839:8E 3E 0C 20 FD AE 20 9E
Ø841:B7 8E 3D ØC A9 ØE 85 2C
Ø849:A9 Ø9 8D 31 Ø3 2Ø 59 Ø8
                             88
Ø851:A9 ØØ 2Ø 42 A6 4C
                       7B E3
Ø859:A9 84 8D 39 ØC A9 ØC 8D 51
Ø861:3A ØC A9 ØØ 8D 3B ØC A9 E1
Ø869: AØ 8D 3C ØC A9 ØØ 8D 84 62
0871:0C 18 60 6C 41 0C A5 BA A0
0879:CD 3E 0C D0 F6 A0 00 B1 7A
Ø881:BB C9 53 DØ ØA C8 B1 BB EB
Ø889:C9 3A DØ ØE 4C 53 ØA C9 95
Ø891:4E DØ Ø7 C8 B1 BB C9 3A B4
```

Ø899:FØ BE A5 B9 FØ 11 20 7B A9 Ø8A1: ØC 84 FB 85 FC 2Ø 7B ØC 1C Ø8A9:84 FD 85 FE 4C CØ Ø8 A5 37 Ø8B1:2B 85 FB A5 2C 85 FC A5 A9 Ø8B9:2D 85 FD A5 2E 85 FE 2Ø 81 Ø8C1: ØF ØC E6 FD DØ Ø2 E6 FE 74 Ø8C9: A5 FD 38 E5 FB 85 03 A5 33 Ø8D1:FE E5 FC 85 04 A5 A3 18 E8 Ø8D9:65 Ø3 48 A5 A4 65 Ø4 BØ 34 Ø8E1:44 48 A4 B7 88 B1 BB 91 4A A4 B7 A9 ØØ 97 Ø8E9:05 88 10 F9 Ø8F1:91 Ø5 C8 A5 A3 91 Ø5 C8 B5 Ø8F9:A5 A4 91 Ø5 C8 C8 91 Ø9@1:05 88 68 91 05 C8 C8 A5 60 Ø9Ø9:FB 91 Ø5 C8 A5 FC 91 Ø5 F3 0911:C8 A9 00 91 05 98 A2 05 DF Ø919:20 50 0C 78 A9 34 85 01 82 0921:A0 00 4C 39 09 4C 7E B9 D0 0929:B1 FB 91 A3 E6 FB D0 02 4A Ø931:E6 FC E.6 A3 DØ Ø2 E6 A4 ØE 0939:B1 FB 91 A3 A5 FB C5 FD 36 0941:DØ E6 A5 FC C5 FE DØ EØ A6 37 85 01 58 20 ØC 56 Ø949:A9 24 Ø951:18 60 4C Ø4 F7 AD 3D ØC 4E 0959:F0 68 A6 BB A4 BC 20 97 7 E Ø961:ØB 9Ø 6F A5 BA C9 08 DØ 43 Ø969:59 A9 ØØ 35 90 A4 B7 D0 42 Ø971:03 4C 10 F7 A6 B9 20 AF A5 0979:F5 A9 60 85 B9 20 D5 F3 43 0981:A9 08 20 09 ED A5 B9 20 98 Ø989:C7 ED 20 13 EE 85 AE A5 C0 Ø991:9Ø 4A 4A BØ BD 2Ø 13 EE 56 Ø999:85 AF 8A DØ Ø8 A5 C3 85 9C Ø9A1:AE A5 C4 85 AF A5 AE 85 5C 09A9:FB A5 AF 85 FC 20 F0 F4 B0 Ø9B1:9Ø Ø3 4C F9 EØ 86 FD 84 97 Ø9B9:FE 2Ø CØ Ø8 A6 FD A4 FE 61 Ø9C1:18 6Ø 6C 3F ØC 85 93 48 5F Ø9C9:68 DØ F7 A5 CD ØC BA 3E 33 09D1:D0 83 20 0F 0C A5 B9 F0 70 2C DØ DF 09D9:19 A0 00 B1 7A C9 09E1:0C 20 7B ØC 85 FE 84 FD 61 09E9:A0 01 4C FD 09 A0 00 4C 0D 09F1:FD 09 A0 01 A5 2B 85 FD 4C 84 AA 09F9:A5 2C 85 FE AØ aa 9A ØAØ1:B1 BB C9 5F DØ Ø3 4C 17 4E ØAØ9: ØB A6 BB A4 BC 2Ø 97 ØB AE ØA11:90 Ø3 4C CA ØB 78 A9 34 26 ØA19:85 Ø1 AØ ØØ B1 FB 91 FD E2 ØA21:E6 FB DØ Ø2 E6 FC A5 FB 54 ØA29:C5 A8 DØ 96 A5 FC C5 A9 1B ØA31:FØ Ø9 E6 FD DØ Ø2 E6 FE 18 ØA39:4C 1D ØA A6 FD A4 FE A5 ØA41:AA FØ Ø7 A9 37 85 01 58 8C ØA49:18 60 00 A6 2D A4 2E 4C 90 ØA51:44 ØA A9 Ø1 85 AA C8 98 50 C8 33 ØA59:A4 BC 18 65 BB 90 Ø1 ØA61:AA C6 B7 C6 B7 20 97 ØB 58 ØA69:90 Ø3 4C CA ØB A5 A8 35 38 ØA71:E5 FB 85 Ø3 A5 A9 E5 FC F4 ØA79:85 Ø4 A5 A5 48 A5 A6 CE ØA81:C8 98 85 A7 A2 Ø5 20 5A GF ØA89: ØC A4 A7 B1 A5 AØ ØØ 91 1E A5 ØA91:A5 A5 A5 C5 Ø5 DØ 06 10 FØ ØA A2 ØA99:A6 C5 Ø6 A5 A 9 12 ØAA1:01 20 50 0C 4C 8A 0A 68 12 ØAA9:85 A6 68 85 A5 AØ 00 FØ В1 ØAB1:A5 FØ 2C 20 08 ØC Bl A5 D5 ØAB9:38 E5 Ø3 91 A5 C8 B1 A5 36 ØAC1:E5 Ø4 91 A5 C8 B1 A5 38 E6

ØAC9:E5 Ø3 91 A5 C8 B1 A5 E5 5C ØAD1: Ø4 91 A5 C8 C8 C8 98 A2 CA ØAD9: A5 20 50 ØC 4C AE ØA 78 3D ØAE1:A9 34 85 Ø1 B1 A8 91 FB E7 ØAE9: A5 A8 C5 A3 DØ Ø6 A5 A9 81 ØAF1:C5 A4 FØ ØF E6 FB DØ Ø2 EB ØAF9:E6 FC E6 A8 DØ Ø2 E6 A9 2 E ØA 37 ØBØ1:4C E5 A9 85 01 58 BC ØBØ9: A5 FB 85 A3 A5 FC 85 AC A4 ØB11:20 24 0C 4C 7B E3 A9 Ø1 46 A9 ØB19:85 AA A9 84 85 A5 ac 3C ØB21:85 A6 AD 8D Ø2 DØ FB A9 27 ØB29:0D 20 D2 FF AG aa B1 A5 36 ØB31:FØ 49 20 ØC 20 an 38 08 DA ØB39:88 84 A7 A5 A8 38 E5 ØB41:AA A5 A9 E5 FC 20 CD BD 6B ØB49:A9 20 20 D2 FF A9 22 20 78 ØB51:D2 FF A6 A5 A4 A6 20 68 68 ØB59: ØC A9 22 20 D2 FF A9 20 30 A4 A5 ØB61:20 D2 FF A7 B1 AA 80 ØB69:C8 B1 A5 C8 84 A7 20 CD 62 ØB71:BD A2 A5 A5 A7 20 50 ØC 88 ØB79:4C 23 ØB A9 12 20 D2 FF 31 ØB81:A5 A3 49 FF AA A5 A4 49 FA 0889: FF 20 CD BD A 2 43 AG GC AC E3 86 BB ØB91:20 68 ØC 4C 7B 4C ØB99:84 BC A9 84 85 A5 A9 ØC CØ ØBA1:85 A6 AØ ØØ B1 A5 FØ 26 64 ØBA9:B1 A5 FØ 24 B1 BB C9 2A 90 ØBB1:FØ 4C C9 3F FØ 4E D1 A5 8A ØBB9:FØ 4A 2Ø Ø8 ØC 98 18 69 BB ØBC1:06 A2 A5 20 50 ac 4C A 3 29 A4 ØBC9: ØB A2 Ø4 4C 37 38 60 ØBD1:C4 B7 FØ Ø4 88 4C BB ØB 8E ØBD9:C8 Bl A5 85 FB C8 Bl A5 D9 ØBE1:85 FC C8 B1 A5 85 A8 C8 8B ØBE9:B1 A5 85 A9 18 C8 A6 AA 69 ØBF1:DØ ØA B1 A5 85 FD C8 B1 EA ØBF9:A5 85 60 C8 FE 60 20 08 3A ØCØ1: ØC 4C DA ØB C8 DØ A1 C8 D3 ØCØ9:B1 A5 DØ FB C8 60 AD 3B 9B ØC11: ØC 85 A3 AD 3C ØC 85 A4 A1 ØC19:AD 39 ØC 85 Ø5 3A ØC 8F AD ØC21:85 Ø6 6Ø A5 A3 8D 3B ØC B9 ØC29:A5 A4 8D 3C OC A5 8D 41 ØC31:39 ØC A5 Ø6 8D 3A ØC 6Ø CB ØC39:00 00 00 00 00 00 00 00 51 ØC41:00 00 20 42 59 54 45 53 7B ØC49:20 46 52 45 45 2E aa 18 90 ØC51:75 ØØ 9Ø Ø2 F6 01 95 00 3D ØC59:60 85 Ø2 38 B5 00 02 E.5 42 8E ØC61:BØ Ø2 D6 01 95 aa 60 39 ØC69:71 ØC 8C 72 ac AØ aa B9 92 ØC71:FF FF FØ F2 20 D2 FF C8 EB ØC79:DØ F5 20 FD 20 9E 3C AE AD ØC81:4C F7 B7 ØØ ØØ ØØ ØØ 00 B4

Joseph Bolin lives in Rockwell, Iowa.

Send new product announcements and/or press releases on your Commodore 64/128 products to Tom Netsel c/o COMPUTE.

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MLX, our machine language entry program for the 64 and 128, and The Automatic Proofreader are utilities that help you type in Gazette programs without making mistakes. To make room for more programs, we no longer include these labor-saving utilities in every issue, but they can be found on each Gazette Disk and are printed in all issues of Gazette through June 1990.

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You can have this program, our PD picks, and all the other programs in this issue by ordering the November-Gazette Disk. The U.S. price is \$9.95 plus \$2.00 shipping and handling. Send your order to Gazette Disk, COM-PUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

# HOW TO TYPE IN GAZETTE PROGRAMS

Each month, Gazette publishes programs for the Commodore 128 and 64. Each program is clearly marked as being written for the 128, 64, or both. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

At irregular intervals, we publish two programs designed to make typing in our programs easier: The Automatic Proofreader, for BASIC programs, and a 128 and 64 version of MLX, for entering machine language programs. In order to make more room for programs, we do not print these handy utilities in every issue of the magazine. Copies of these programs are available on every Gazette Disk. If you don't have access to a disk, write us, and we'll send you free copies of both of these programs. Please enclose a stamped, self-addressed envelope. Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

When entering a BASIC program, be especially careful with DATA statements, as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the com-

puter). If this happens, the only recourse is to turn your computer off and then on, erasing what was in memory. This could cause you to lose valuable data, so be sure to save a program before you run it. If your computer crashes, you can always reload the program and look for the error.

#### **Special Characters**

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from Gazette, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor-down key; {5 SPACES} means to press the space bar five times. {RVS} means to enter Reverse mode by simultaneously pressing the Ctrl key and the 9 key.

To indicate that a key should be shifted (hold down the Shift key while pressing another key), the character is underlined. For example, A means hold down the Shift key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight shifted A's).

If a key is enclosed in special brack-

ets, [<>], hold down the Commodore key (at the lower left corner of the keyboard) and at the same time press the indicated character.

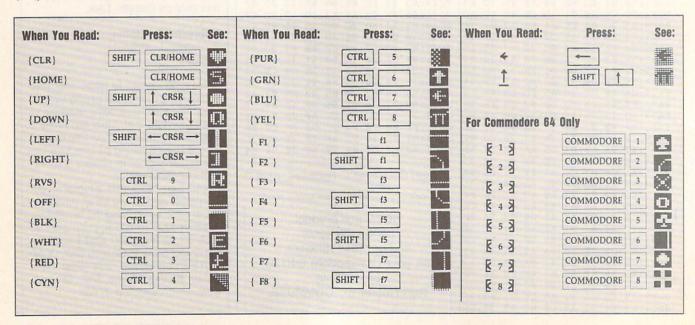
Rarely, you'll see a single letter of the alphabet enclosed in braces. This can be entered on the Commodore 64 by pressing the Ctrl key while typing the letter in braces. For example, {A} means to press Ctrl-A.

#### The Quote Mode

You can move the cursor around the screen with the Crsr keys, but you may want to move it under program control, as in examples like {LEFT} and {HOME} in the listings. The only way the computer can tell the difference between direct and programmed cursor control is the quote mode.

Once you press the quote key, you're in quote mode. It can be confusing when you are in this mode if you mistype a character and cursor left to change it. You'll see a graphics symbol for cursor left. Use the delete key to back up and edit the line from the beginning. Type another quotation mark to get out of quote mode.

If things get too confusing, exit quote mode by pressing Return; then cursor up to the mistyped line and fix it. If the mistake involves cursor movement, however, you must press the quote key to reenter quote mode.







Fatty Bear and his friends have a lot to do before Kayla wakes up. Matilda Rabbit's busy with the cake. Gretchen's working on the decorations. The puppy's getting into mischief, and the garage door opener has disappeared.

Fatty Bear's Birthday Surprise™ is an adventure game designed especially for children. Children enhance their problem-solving skills, while happily exploring Fatty Bear's world; the goals even vary in response to your child's actions.

So, what are you waiting for? Morning's almost here, and a bear can only do so much alone.



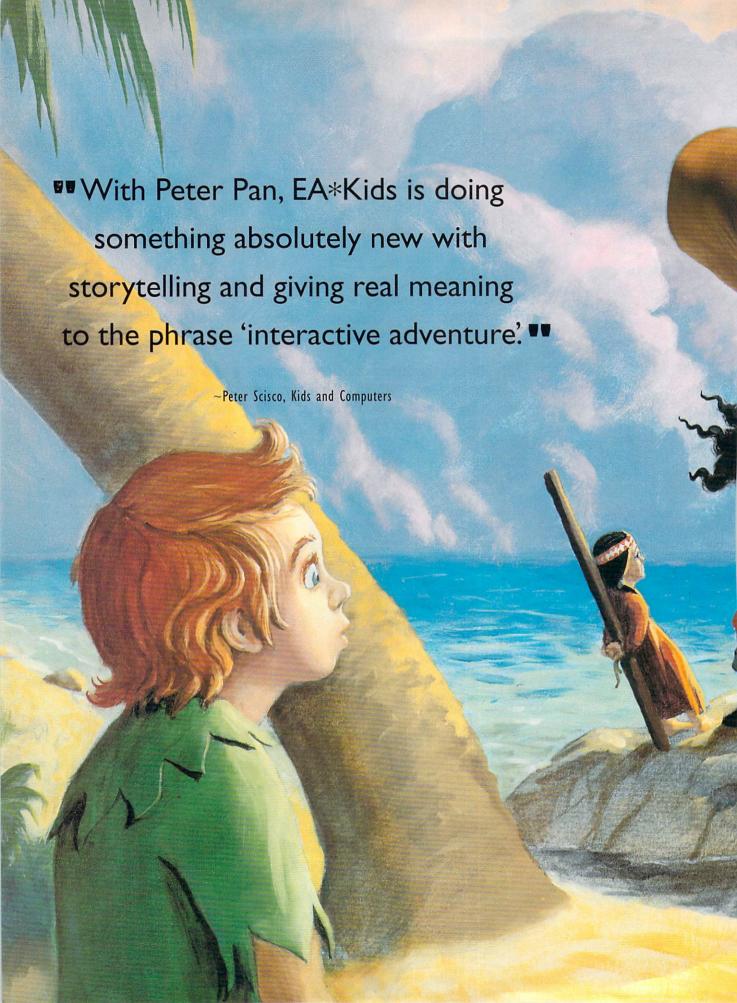


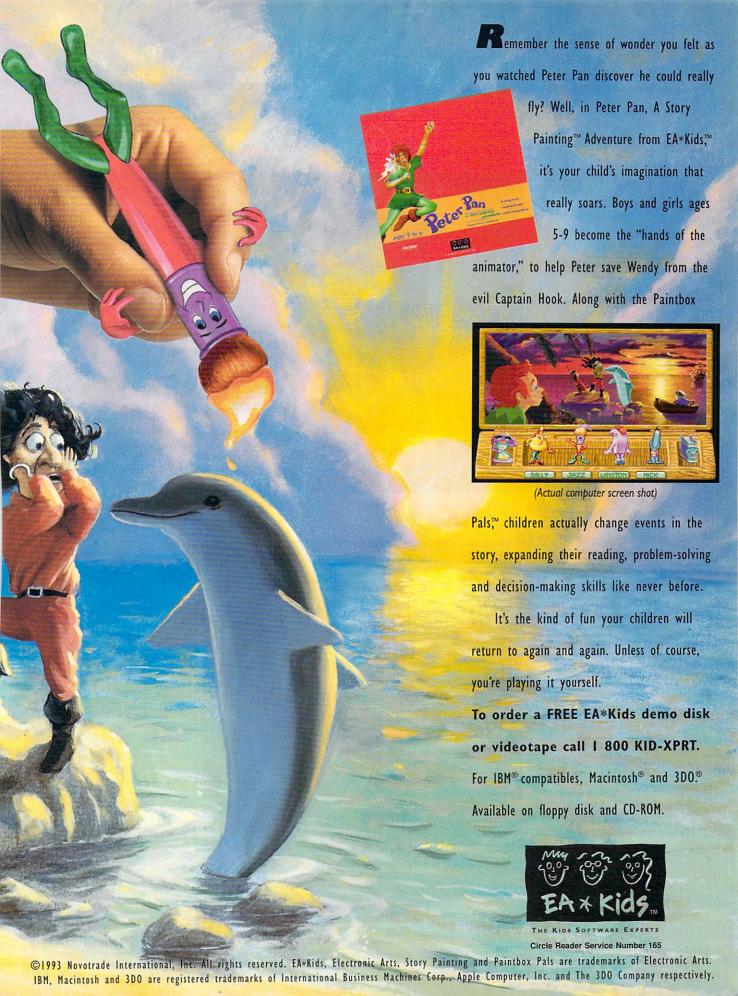




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#### **ALR EVOLUTION** IV MPC

ALR's Evolution IV MPC boasts good looks, power, and an attractive price. However, it's the system's expandability, quality, and great software bundle that make it a standout in the crowded MPC market.

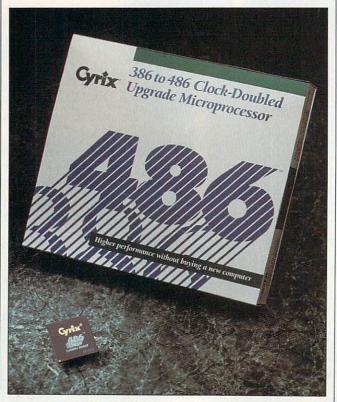
Let's start with the basics. The standard Evolution IV MPC package comes with an Intel 486DX/33, 4MB of RAM, and six drive bays (three accessible from the front). The system sports six 16-bit ISA-bus slots, two of which can be used with VL-Bus extensions and one of which can be used with ALR's proprietary local-bus extension. The ZIF socket lets you upgrade the CPU with one of Intel's OverDrive chips (including the 32- or 64-bit P24T version of the Pentium), and you can upgrade memory all the way to 52MB on the motherboard.

My review system was fully decked out with a 240MB Western Digital Caviar drive, a VL-Bus ATI Mach 32 video adapter, 8MB of RAM, and the optional 256K cache, which provides zippy performance even in demanding multimedia applications. It also came with a 31/2-inch floppy drive, a Sony CDU 31-A2 CD-ROM drive (the system now ships with a Texel DM-3024 dualspeed drive), a Media Vision Pro AudioSpectrum 16 sound card, and a Labtec microphone. ALR routes the audio board's sound through the PC's speaker (which is very good, as PC speakers go), and you can hook up your own external speakers. I found the system's case solid and accessible.

A standout feature is the TriCombo card, which occu-



ALR's Evolution IV packs great multimedia performance into an attractive package with an attractive price.



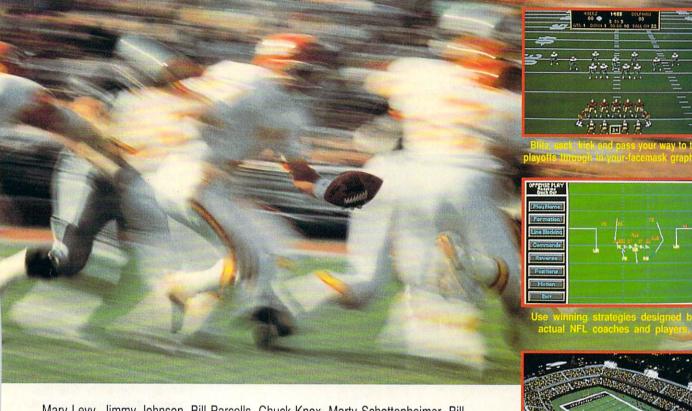
The Cyrix Cx486DRx2 replacement microprocessor brings 486 performance and compatibility to your current 386DX system.

pies the proprietary local-bus slot and provides ATI localbus video, a 256K processor cache, and an Ethernet networking adapter.

While a number of manufacturers-even some of the big names-have had trouble with quality control in the form of faulty motherboards, short-lived hard drives, and similar problems, I encountered no such difficulties with this MPC. The components come from respected, reliable manufacturers, and ALR offers a limited five-year (chassis, motherboard, and power supply)/15-month costs and peripherals) warranty with optional on-site service and available extended-warranty options. While there was a longer-than-usual delay in switching from graphics to text mode on the bundled ALR 14-inch noninterlaced SVGA monitor, that's only a very minor quibble; generally, I found it sharp, stable, and easy to look at. I liked the feel and action of the keyboard, and the two-button mouse worked fine.

Preinstalled on the system are MS-DOS 6, Windows 3.1, WinCIM (for access to CompuServe, if you opt for a modem), and several CD-ROM titles, including Cinemania, Works for Windows, Multimedia Beethoven, Bookshelf for Windows, Kodak Photo CD AC-CESS software, and Microsoft's Multimedia Pack 1.0. If you opt for a fax/data modem, you'll also receive Eclipse Fax for Windows. If you'd rather avoid the hassle of installing a number of hardware and software items on your new system, this may be the MPC for you. I thoroughly enjoyed this system and found it ready for the most demanding applications. ALR offers a multitude of system options; contact the company for a system configured to

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This is NFL action so real you'll be scraping the mud from your face. You'll plow through the trenches. Shake off bone-crunching tackles. Perform acrobatic catches. And choose players based on true-to-life characteristics like blocking and coverage skills, height, weight, and speed.

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**NFL Coaches Club™ Football** from MicroProse. Your chance to learn from the best. Then beat them at their own game.



Create your own NFL team dynasty and head to the Super Bowl.



Choose players based on skills, size, and speed.

#EREPTAINMENT SOFTWARE

SERIOUSLY FUN SOFTWARE

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ALR (800) 444-4ALR (714) 581-6770 \$3,047—base ISA system with 33-MHz 486DX and 240MB drive \$149—256K cache \$270—extra 4MB of RAM \$79—ALR 96/48/24 fax/data modem

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#### CYRIX CX486DRX<sup>2</sup>

It's no fun owning a 386 anymore. With today's more powerful software, 386 machines feel slow. You could sell your 386 and buy a new 486, or you could buy a new 486 motherboard and swap out your old one. But there's a third solution that's much less complicated.

Cyrix has a single-chip upgrade that can bring 486level performance to your 16-MHz, 20-MHz, or 25-MHz 386DX system. All you do is pull out your old CPU (a chip puller is included), put the new Cx486DRx2 chip in its place, install the heat sink on top of the chip (20-MHz and 25-MHz upgrades only), and install the cache software (which simply turns on the processor's cache; it doesn't take up any memory).

The new chip speeds up your computer in three ways. First, it acts as a clock doubler, so your 16-MHz machine will run at 32 MHz, your 20-MHz machine will run at 40 MHz, or your 25-MHz machine will run at 50 MHz. Second, the chip includes a built-in 1K cache, which isn't found on 386 chips. (A true 486 has a built-in 8K cache, which gives it a greater advantage in this area.) Finally, the Cx486DRx2 has an instruction set that's compatible with Intel's 486 instruction set. According to Cyrix, all DOS, Windows, and OS/2 software will work with its upgrade chip.

The upgrade chip doesn't include a math coprocessor (which the 486DX has, but the 486SX doesn't have). However, it is

getting the Cyrix 486 upgrade chip is the best way to speed things up.

DAVID ENGLISH

Cyrix (214) 994-8388 \$299—Cx486DRx<sup>2</sup> 16/32 \$349—Cx486DRx<sup>2</sup> 20/40 \$399—Cx486DRx<sup>2</sup> 25/50

Circle Reader Service Number 435



Wing Commander Academy lets you create your own custom missions against cunning, feline Kilrathi opponents.

compatible with Intel's 387 math coprocessors and Cyrix's own FasMath 83D87 math coprocessor.

I tested a Cx486DRx2 20/ 40 chip on a four-year-old ZEOS 386DX system. Before I installed the Cyrix Norton Utilities showed an Intel 20-MHz 386DX with a speed of 8.9. After the installation, Norton showed a Cyrix 40-MHz 486 with a speed of 47.9. With the 386DX, WindSock reported speeds of CPU: 85, Video: 37, Disk: 82, Memory: 35, and Overall: 70. With the 486DRx2, WindSock reported CPU: 268, Video: 86, Disk: 113, Memory: 35, and Overall: 160.

As you can see from the WindSock numbers, a faster processor can even accelerate your system's video and hard drive performance. Short of buying a new motherboard or a new computer,

#### WING COMMANDER ACADEMY

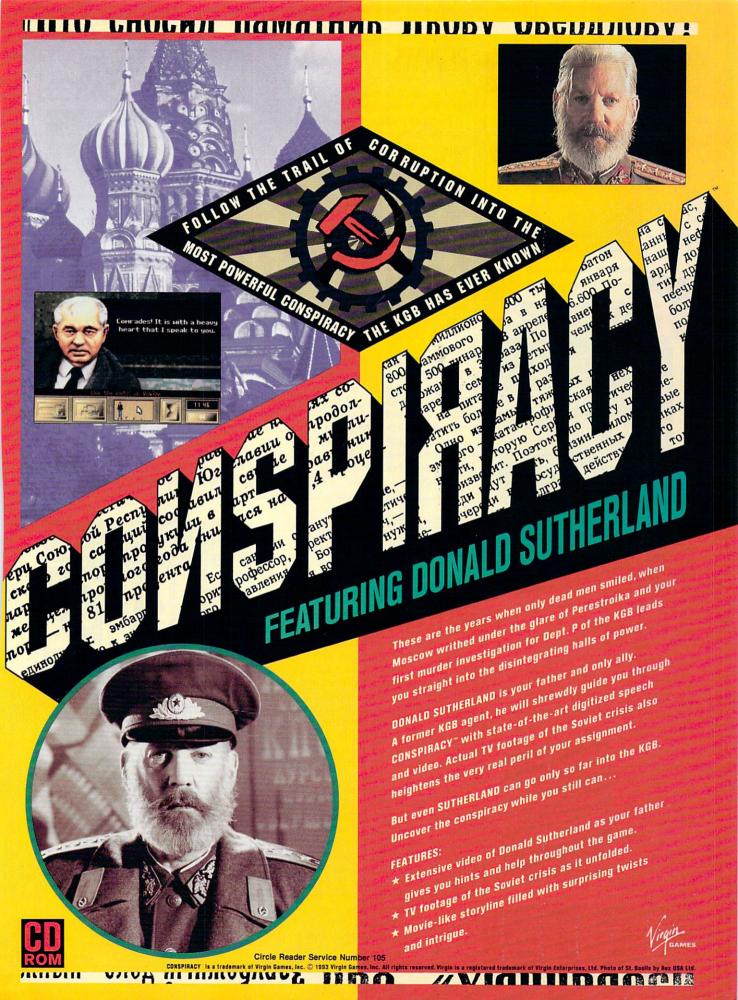
Piloting two ponderous Crossbow attack ships, you and your wingman drop out of autopilot at Nav Point 4. As you survey the starscape, a strange sense of déjà vu overcomes you. Two Ralatha capital ships, your primary targets, hang motionless in the distance. Between you and your targets swarm a mess of Kilrathi fighters, like angry bees protecting their queen. You give Hobbes the order over the communication circuit to break and attack, then pull the ship hard to the right and do the same . .

That sense of déjà vu could be caused by a number of things. Perhaps you spent many hours playing one of the first two Wing Commander games, and you've encountered the feline Kilrathi before. Or maybe it's just the tenth time in an hour that you've tried to make it through this specific mission. Cursing as you explode yet again, you have no one to blame but yourself—after all, in Wing Commander Academy, you're the one who made it so tough.

In Academy, you aren't flying in the persona of "old blue brow," the familiar hero from the preceding games. Instead, you're a cadet at the Confederation Academy. Rather than facing actual combat, you experience missions courtesy of a holodeck-style simulator. Designing these missions is up to you.

Academy uses the Wing Commander II engine and scraps the story line that wraps around the missions in the earlier games in favor of an elegant, albeit simplistic, mission design editor. You design your own missions and then play them through. Missions can be saved to disk and shared with friends. Gamers looking for cinematic drama won't find it in Academy; Wing Commander fans, however, will find combat scenarios limited only by their imagination and skill.

In Design mode, you place enemy craft and obstacles at each navigation point as you see fit. There are 16 ship types to choose from, including two new designs. Adding variety and challenge are asteroids and minefields, retrievable data pods and ejected pilots, and a space station to defend. You can choose wing men—simulated versions of the sidekicks from the first two games—or choose to



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usic, animations, song lyrics, and musical notation combine to make singing along a real treat for children and parents. *Dr. T's Sing-A-Long* introduces your child to the wonders of music! Each song has its own unique characters, animated story and sound effects. Notes and lyrics scroll in time with the music. Older children re-enforce reading skills and learn

to read music. Younger children love to sing and watch the

animations.



# Dr. T's Software For information, call 1-800-989-6434.

#### REVIEWS

go it alone. The relative skill of each enemy pilot is also selectable.

Turning tradition on its head, you can fly missions as a Kilrathi pilot up against Confederation fighters. If you just want to dive in and start shooting, the Wave mode skips the mission design altogether. You face progressively tougher ships in progressively larger numbers and shoot for the highest score.

Taking the story *out* of a game is a bold move by Origin and a concept that would be anathema to many of today's top designers. Narrative framework almost always helps to bridge the emotional distance between player and game. Yet Academy succeeds because designing the missions puts some of "you" into the game. An added benefit is that jettisoning story animation lets Academy fit in just under 5MB of hard drive space.

If you're looking for some outer space action while you await Wing Commander III, you'll find that Wing Commander Academy is a great, all-action playground where you can keep your battle skills honed.

DAVID GERDING

Origin Distributed by Electronic Arts (512) 335-5200 \$49.95

Circle Reader Service Number 436

#### **SYNDICATE**

The recent trend in science fiction has been to paint the near future as a dark, dirty dystopia. Electronic Arts' science-fiction strategy game, Syndicate, is no exception. Created by Bullfrog, which brought us Populous and Power-Monger, Syndicate is a dark, bloody, Ridley Scott-esque strategy game set in 2096. You take on the role of a pseudogodfather, riding herd on a crime syndicate looking to cash in on a world made ripe for plundering by megacorporations.

The task is simple: You must conquer the globe through a series of covert assassination, bloodbath, and persuasion missions. The tools of your trade are genetically augmented cyborgs, outfitted with a neural control device which allows you to alter the brain chemistry of the agents, boosting their intelligence, perception, and adrenaline levels. While the agents battle it out on the streets of tomorrow's cities, you hover safely overhead in an ultramodern airship.

You conquer each territory by com-

#### COMPUTE LIBRARY CASES



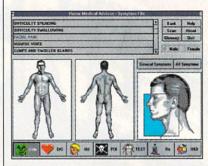
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Or mail your order, clearly showing your account number and signature. PA. residents add 7% sales tax.

SATISFACTION GUARANTEED



The Windows version of Dr. Schueler's Home Medical Advisor may be the closest thing to a modern house call.

#### OOPS!

In our August 1993 issue, we ran a review of the Windows version of Doctor Schueler's Home Medical Advisor, but we showed a screen shot from the DOS version. Here's the Windows screen shot that should have appeared with the review.

Doctor Schueler's Home Medical Advisor, Windows Version

Pixel Perfect (800) 788-2099 (407) 779-0310 \$87.50

Circle Reader Service Number 437

pleting a specific mission plan, and as your sphere of influence grows, so does your revenue from taxes. Revenue is important, because the only way to succeed in the series of increasingly difficult missions is to have stronger and faster agents armed with more and better firepower. The cyborg agents can be updated in any number of ways, from cybernetic limbs to en-



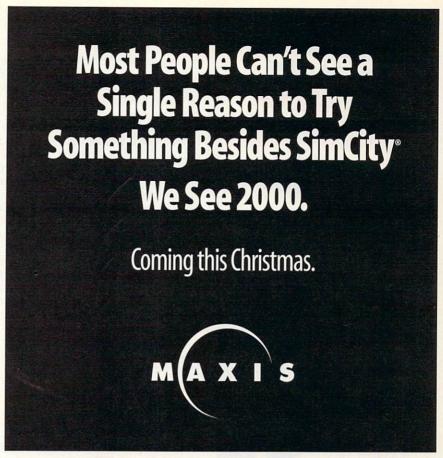
Syndicate's futuristic cities are full of numerous deadly challenges.

hanced computerized brains. Weapons range from simple automatic pistols to high-powered laser rifles and beyond. To have access to these toys, though, you must research the technology, and as any good technohead knows, research costs serious money.

Once the agents have been outfitted with the tools of the trade necessary for the mission, they're delivered to the scene of the mission, and you assume control. The play screen is divided into three main windows. The first gives control of the agents, either singly or as a group. You can alter the agents' chemical levels and may even choose to induce a state of controlled panic, pumping all drug levels to maximum. When pumped up, the cyborgs really fly, but when the drug wears off, they slow down considerably. The second window is an overhead sensor display which shows the direction of the object or person that is your mission objective and indicates the location of civilians, police, and rival cyborgs. The main window shows a skewed 3-D overhead view of the city, rendered in crisp, brooding Super VGA. The attention to details—such as working levitation cars, magnetic-levitation trains, and neon billboards-is impressive, but the cities are just a touch too clean and sharp-edged for such a bleak future.

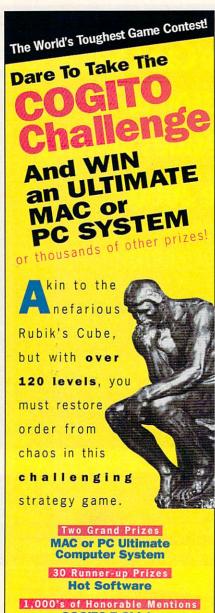
You control the movement of the agents, as well as which weapons they shoulder and whom they fire upon. Often missions become bloodbaths, with rival agents and police officers descending from all corners. The Al is decent, although not brilliant. I do like the way the civilians run away when you level your sights on them.

Syndicate is a lot of fun. The game



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#### **INLINE SOFTWARE**

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Circle Reader Service Number 155

#### RFVIFWS

is easy to learn, but the missions are challenging enough to keep the interest level high. While scenarios are centered on offensive firepower, you've got to develop a unique defensive strategy for each mission. You may, for instance, need to split your agents, hiding one behind a corner to rush in and flank the enemies. As you battle, weapons run dry pretty quickly, but you can always use the rather nasty tactic of cop hunting. One shot will take a policeman out, and your agent can then retrieve a fully loaded shotgun to pursue more important targets. This isn't a game to use as a morality lesson for the kids-it's bloody, it requires you to be ruthless, and some people may take issue with the use of drugs to control your agents. But it's a ball to play. PAUL C. SCHUYTEMA

Electronic Arts (800) 245-4525 \$59 95

Circle Reader Service Number 438

#### PANASONIC KX-P2023

If I had the same luck with light switches as I do with DIP switches. I'd have to learn to read in the dark and sleep with the lights on. So I was pleasantly surprised to see the Panasonic KX-P2023 dot-matrix printer has no DIP switches at all. None. The printer comes with a 31/2 floppy disk with a DOS setup program that takes the place of the missing-but not missed-DIP switches and lets you control the printer from your computer.

The control panel on the printer is easy to understand and operate-not one of the five buttons has more than two functions, and they're all clearly labeled. In addition to simplicity, the P2023 offers 24-pin quality and several useful features, including paper parking, tear-off advance, and automatic loading for both single-sheet and tractor-fed paper. It has four letter-quality typefaces resident, and with 360x 360 dpi resolution, TrueType and other graphic soft fonts print beautifully, albeit slowly.

The P2023 offers a Super Quiet print mode; but it's an inherantly quiet printer even in standard mode, and I don't think the slight reduction of printing noise in Super Quiet mode is enough to justify its slower printing.

In spite of its quiet, easy operation, the P2023 can arouse some typical dotmatrix frustrations. If you like precise margins, you can expect to fiddle with your software's margin settings and the

paper position for each application that uses its own printer driver. The included Windows 3.1 driver offers greater control over default settings than the printer's DOS setup program (it offers Epson and IBM printer emulations), so once you get the paper positioned and margins tweaked, you shouldn't have to adjust them each time you change Windows applications.



The KX-P2023 comes with disk-based software for easy configuration.

On the printer I tested, tractor-paper jams were another frequent annoyance. The problem appeared to be the clear-plastic paper guide above the platen, which often caught the top edge the paper. (It didn't seem to cause a problem with single sheets.) Avoid the problem by swinging the guide out of the way to keep the first sheet from

Paper feeding problems aside, the KX-P2023 is a good choice for home or small-business use if you want to forego the extra expense of an ink-jet or if you need to print multi-copy forms. PHILLIP MORGAN

Panasonic (800) 222-0584

Circle Reader Service Number 439

#### THE NORTON UTILITIES 7.0

The Norton Utilities 7.0 is Symantec's counterpoint to DOS 6. DoubleSpace. Stacker, and SuperStor. It's true that you'll find minor improvements in most of the 7.0 utilities, but if you're using DOS 6 and one of these compression programs, you'll have more reason to upgrade.

The best of 7.0's compression-savvv utilities is the Norton Disk Doctor (NDD). NDD is a one-stop hard disk hospital that offers everything from diagnostics to surgery-all packaged in an automated, easy-to-use shell. The new NDD has all the powerful discovery and repair tools of its predecessors, plus it's aware of compressed

Over one hundred play areas to test your reflexes and intelligence.

# GEARWERKS:

This puzzle game will keep your gears spinning!

Gear Works is the most unique puzzle game to hit the market in years. In Gear Works you will connect gears of various sizes and colors together in order to transform Twelve Wonders of the Ancient and Modern world into time pieces, while racing against time and friction. Watch out for the Pottins, two gremlin like creatures, that will torment you by rusting the gears and breaking off the mounting pegs.

Game features: Various gear types, over one hundred puzzles to solve, bombs to blow up incorrectly placed gears and a gun to shoot those pesky Pottins off the play area.

Available in IBM PC and Amiga computers.

Check your local retail stores for Jonny Quest<sup>o</sup>-Curse of the Mayan Warriors and other HOLLYWARE Games.

Circle Reader Service Number 117







GEAR WORKS



HOLLYWARE ENTERTAINMENT P.O. Box 9148 Marina Del Rey, Ca. 90295 (310) 822-9200

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drives and handles them intelligently. If you ask NDD to scan a compressed drive, for example, it not only scans the compressed drive but also scans the host drive and tests the data structures on the compressed drive.

It's worth noting, however, that with Stacker, I've encountered some problems that NDD couldn't fix but Stac's Check could. Many users run NDD in their AUTOEXEC.BAT files to catch disk errors on startup, so that they can be fixed before they multiply.

Like NDD, SpeedDisk is hip to compressed drives, but you might feel safer using the defragger that comes with your compres-

sion program. Of the other utilities, the most improved is Disk Editor. This program lets you edit your hard disk on the physical level (sides, tracks, and sectors), the organizational level (partitions, boot sectors, and FATs), and the logical level (files and directories). New in 7.0 is ARM, Advanced Recovery Mode, an automated system that makes recovering data easier. Learning to use Disk Editor may well save your bacon some day.

Arrrrrrgh! That's the sound most of us make when we accidentally delete a file. Peter Norton made his reputation in 1982 by turning this sound into a sigh of relief with Undelete. Naturally, no edition of The Norton Utilities would be complete without undeleting tools, and this version boasts new incarnations of Undelete and SmartCan, which is the Norton equivalent of Delete Sentry in DOS 6.

To mention just a few of the remaining tools, you'll find NDOS (a powerful COM-



The updated version of File Find is just one of many enhanced utilities included with The Norton Utilities 7.0.



Funny, but sometimes gory, animated sequences play when you capture a piece in Chess Maniac 5 Billion and 1.

MAND.COM replacement COMPUTE based on Choice Award winner 4DOS), much improved system diagnostics, a new version of File Find, and my favorite, NCD, the Norton Directory. Change wouldn't be caught dead at the DOS prompt without NCD.

For a set of time-tested DOS utilities, The Norton Utilities is a solid choice. And if you're using DOS 6 or a disk compression program, it's definitely worth owning. CLIFTON KARNES

Symantec (800) 441-7234 \$179 \$49 (upgrade) \$99 (for DOS 6 owners)

Circle Reader Service Number 440

#### NATIONAL LAMPOON'S CHESS MANIAC 5 BILLION AND 1

Chess Maniac is a chess program that refuses to take itself seriously. In a market dominated by programs with an emphasis on speed and strength, a chess game with a definite sense of humor is a welcome break.

The manual for Chess Maniac, written in the style of National Lampoon magazine, is a delightful parody of everything pompous about intense chess players; however, the program itself is disappointing. It ships on 12 disks and re-

quires 27MB of hard drive space—the installation process took over two hours on my system. Like too many games, it requires EMS, so I had to reconfigure my startup files to play.

The game is a fairly simple chess game which offers a choice of standard or animated character sets in either two- or three-dimensional views. You choose from ten opponent strength levels (the opponents tend to be weaker than those in other chess programs). Of course, if Chess Maniac was the chess program that grabbed your attention at the local computer emporium, you may be more interested in watching the onscreen antics of the chess pieces than in searching for a cybernetic Bobby Fischer anyway.

The pieces capture each other in unusual ways, ranging from a deathly lambada by the belly-dancing pawn to gory decapitations by the sickle-wielding rook. Frequently, animated distractions flash across the screen, and the program occasionally cheats by stealing your pieces. This is an interesting feature, but it isn't very useful to your computer opponent, since you can easily use the program's board editor to get your pieces back. Moving the pieces with the mouse can be very difficult, and at times it seems impossible to place a piece on the correct square. Two-dimensional and standard chess sets are available to help keep you oriented, as the character board is often cluttered and difficult to see.

Chess Maniac doesn't play world-class chess, but it does add some hilarious touches to what can be a staid, stuffy game. Unfortu-



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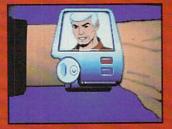
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nately, the difficulty of discerning piece positions, along with the stiff hard drive requirements, puts a bit of a damper on the fun.

Spectrum HoloByte (800) 695-GAME \$69.95 (disk version) \$59.95 (CD-ROM version)

Circle Reader Service Number 441

#### BATTLE CHESS 4000

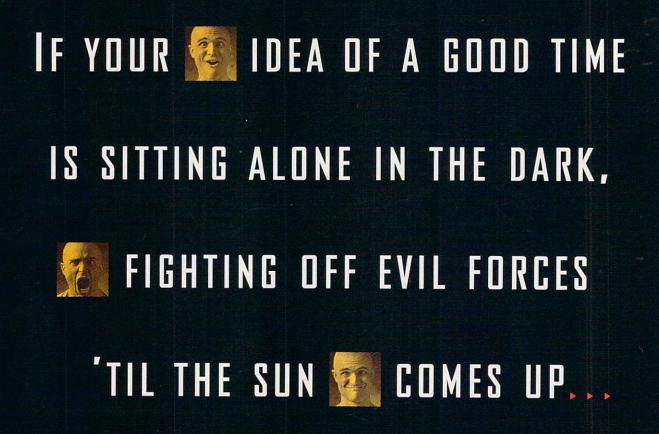
Not long ago, Interplay revamped chess, giving the classic game a whole new look and feel. Instead of stoic bishops and banal queens of plastic, ivory, or stone, the original Battle Chess brought pieces to lus-



Interplay's spaced-out Battle Chess 4000 takes the classic animated chess challenge into a weird, distant chess future that's full of robots, aliens, and futuristic humanoids.

cious, violent life and breathed a bit of magic into the standard affairs of play. Today, Interplay takes us far beyond the medieval visions of its earlier offering, beyond the Asian feel experienced in its Chinese variant, and headlong into an unearthly future. A.D. 4000, here we come!

If you're familiar with classic chess, you'll be right at home in Battle Chess. The primary graphic innovation is obvious, with each piece a futuristic humanoid of some sort. These pieces possess their own unique characteristics: rough-and-tumble queens that always mean business, leechlike pawns that squish around the board, self-assured bish-



ops that practice a science so advanced it seems magical. When the pieces clash, a combat sequence is certain to follow, so keep your eyes on the screen. In Battle Chess 4000 these combat sequences run on the hilarious side. The rookwhich transforms from a tiny, inert form into a towering, ambling robot—seems to have the greatest sense of humor. Unfortunately, the combat ends as you might predict: the attacking piece always wins. This predetermination, common to all versions of Battle Chess. marks the ceiling for innovation. Everyone knows a monster robot will squash a leech. As a variant, Interplay could offer chess with more

tactical considerations, such as how many attacks a rook can sustain before collapsing or how many attacks a bishop can make before he needs a recharge. Even in A.D. 4000, Battle Chess remains merely computer chess with impressive graphics

The graphics here are outstanding. The SVGA version provides extreme detail, right down to the grimaces and smirks on the pieces' outsize faces. The overall look seems a bit cartoonish, but that, in turn, makes the explosions, decapitations, and general violence more acceptable. Some may find it disturbing that both this game and Spectrum Holobyte's National Lampoon's

Chess Maniac 5 Billion and 1 both feature violence at the level of decapitation.

An outstanding array of options including moves by the book, forced moves for the computer, and hints on demand makes Battle Chess 4000 a chess game for everyone. It allows you to take back moves, explore what-if possibilities, and choose from a list of more than 300,000 moves. When the combat animations lose their appeal, you can activate the standard two-dimensional playing field, the familiar face of computer chess. We can hope, however, that the next version will allow us to adjust the speed of the animations. While watching the rook unfold into a robot and

walk across the screen proves initially delightful, after only a game or two, the time required for the animation is just aggravating.

If you haven't encountered Battle Chess before, you might want to pick up a copy of Battle Chess 4000. If your tastes run toward the more exotic or to the medieval, consider the other members of the product line. Any version of Battle Chess provides a worthy computer opponent for potential grand masters.

DAVID SEARS

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#### **REVIEWS**

# KIPLINGER'S CA-SIMPLY MONEY

Some would say that you'd have to give away a new program to get any kind of market penetration in today's ultracompetitive PC software market-place. That's exactly what Computer Associates decided to do with its new personal finance manager program: Through November 4, 1993, the company is giving away up to a million copies of Kiplinger's CA-Simply Money. The only charge is a \$6.95 fee for postage and handling.

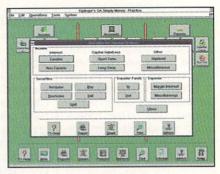
The incredible price doesn't mean vou're stuck with a limited, specialversion package, either. It's the fullblown package, complete with a thick. heavy, and well-written reference manual. CA-Simply Money is a personal finance manager that also helps you make decisions about mortgages, refinancing, retirement, debt payoff, investments, college tuition, and even household help and payroll. Along with the usual electronic check register, the program includes the Kiplinger Financial Advisor, which tracks all your transactions and offers you personalized financial advice.

CA-Simply Money runs under Windows 3.1 and provides a simple, iconbased user interface. Instead of forcing you to scroll through long lists of accounts looking for the one you need, CA-Simply Money provides Browsers; typing one or more letters produces a pop-up window which contains a list of related buttons, categories, or classifications. This makes recording transactions much faster and easier. And you can easily call up any of 50 preprogrammed reports which provide quick, useful information about your accounts to help control and direct financial matters.

For the novice in financial recordkeeping, CA-Simply Money goes a step past the automatic budgeting systems of other financial programs by automatically prompting for repetitive payments and drafts. Repetitive transactions are recorded so that payees and account distributions are processed automatically. You'll have to compute percentages manually for transactions involving a home office or automobile that's used for business purposes, though; it would be nice if the program had a data feature that would compute these automatically.

The Financial Advisor feature provides context-sensitive advice and comments written by the prestigious Kiplin-

ger editorial staff. Its handy Alert feature can optionally pop up whenever you start Windows, warning you when you need to take care of pending items such as payments or deposits. Financial Advisor will warn you if a recurring transaction seems overly large or small, alerting you, for example, if your normally \$80 phone bill jumps to \$553. The Advisor feature looks at your cur-



Kiplinger's CA-Simply Money is a powerful, but easy to learn, finance program.

rent financial situation and offers tips for saving money. For instance, it might advise you to take out a home equity loan to pay off your credit cards, lowering the amount of interest you pay each month. Unfortunately, the financial advice can't currently be printed out for offline review.

I did run into a few quirks when using the program. Check numbers aren't automatically assigned when you enter transactions, a limitation which a company representative said will be corrected in a future release. Also, when I entered after-the-fact transactions, automated date functions became confusing, making entries more difficult than necessary.

CA-Simply Money imports and exports files in Quicken format, exports to any tax-exchange-format (TXF) tax preparation program, and can use DDE to communicate with databases and spreadsheets. Of course, you can print checks on your printer, but CA-Simply Money also works with Prodigy's BillPay USA system to pay bills electronically. You can also use it with CompuServe's online financial database and stock quote system to get updates on stock prices and live financial advice.

For the lucky million or so purchasers who order the program before November 4, CA-Simply Money is the least expensive finance manager program available. But CA-Simply Money is by far the easiest-to-use, most advanced financial recordkeeping and money management package available today—so it's worth taking a look at even at the full retail price.

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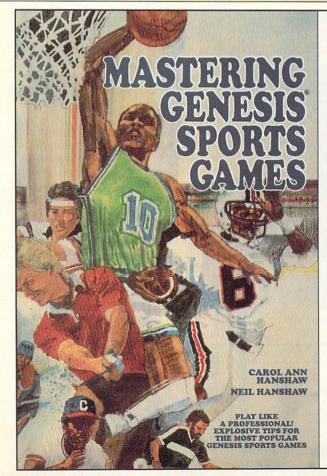
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REVIEWS

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#### STYLUS 800

The Stylus 800, a 48-nozzle ink-jet printer from Epson, was hard at work in my office just minutes after it arrived. I had been using my 24-pin dot-matrix printer to print several letters, but I decided to finish the job with the new Epson. All I did was disconnect the printer cable and plug it into the Stylus 800, which performed flawlessly. I had to adjust the margins from my word processor, but I never even switched printer drivers.

Many older applications may not have a Stylus 800 driver, but the manual suggests more than a dozen Epson SQ- and LQ-series drivers that should work with most applications. I had no problem printing out banners, correspondence, and graphics with the driver that I had used with my dot-matrix printer. For convenience, the Stylus package includes drivers for ten popular applications, including Windows 3.1, AutoCAD 2.5 or higher, WordPerfect 5.1 or higher, Microsoft Word for DOS 5.5, and Lotus 1-2-3 3.1 and 3.1 + ...

The Stylus 800 delivers crisp 360dpi text and graphics. Overall print quality is not quite laser-sharp, but it's pretty darned close. The drop-in ink cartridge is rated at 700 pages with 1000 characters per page. I've been cranking out page after page for weeks now, and the print quality is still high. When the ink supply is low, a light on the panel lets you know. Replacing a cartridge shouldn't put much of a dent in your budget; the suggested retail price of a new one is less than \$20.

You can load as many as 100 sheets of paper into the 800's built-in paper holder. This is fine for most printing jobs. If you prefer, you can feed single sheets and envelopes manually without disturbing the other paper.

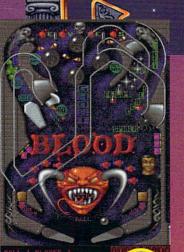
Paper quality does affect print quality, however. If the paper is porous or rough, you may see some blurring. Most conventional computer paper works fine. Should the print quality start to diminish, you can press two buttons on the control panel to clean the printhead. This simple 30-second procedure assures a good stream of ink through the nozzles.

The ink-jet technology makes the Sty-

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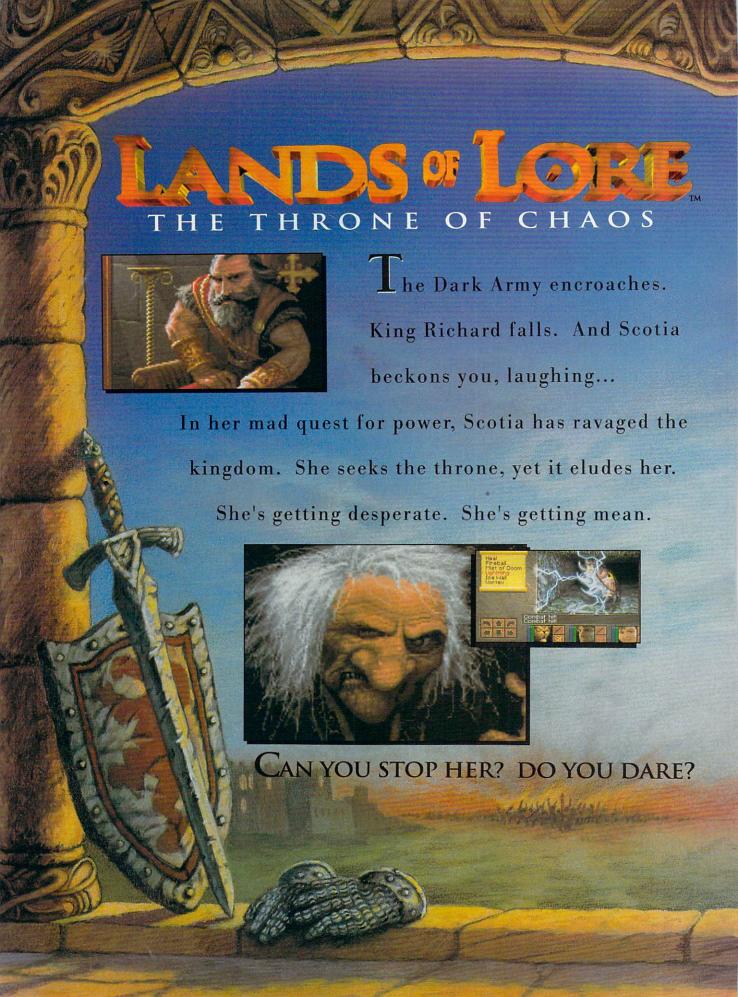


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#### RFVIFWS

lus quiet and reasonably fast. Printing speed is rated at 180 characters per second. The compact size lets the Stylus fit easily into most any work area.

The Stylus has seven built-in character fonts: four of them are scalable from 8 to 32 points in 2-point increments. There's also an economy mode that uses less ink for draft copies and a condensed mode that's handy for printing spreadsheets. Many of the printer's controls can be set by your program rather than from the control panel.

Internal settings control the character tables for different language applications and similar settings. If your software has problems printing scalable font text combined with graphics, the Stylus has a mixed text and graphics mode that should help. There's even a setting for using the printer with several computers on a network.

If you're used to the large size of many dot-matrix or laser printers, you may wonder about the strength and reliability of the Stylus. Don't let its small footprint and light weight fool you. This little gem is a real workhorse. It's proved itself in my office.

TOM NETSEL

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#### THUNDER BOARD

Do you find that hearing "bleep, beep, bloop, buzz" sort of ruins the fantasy when you're playing your favorite flight simulator? Are you tired of watching your computer grind to a halt every time the Windows sound driver plays a digitized sound? It's time to join the multimedia party and purchase a sound card. If you're looking for a quality sound card at a low price, check out Media Vision's Thunder Board.

This half-size 8-bit ISA card includes an Ad Lib-compatible 11-voice FM synthesizer and supports 22-kHz digital audio. The back of the card has audio input and output jacks, a volume-control dial, and a joystick port. An internal connector allows you to mix sound from a CD-ROM drive or Pro AudioSpectrum card.

The card is advertised as being fully compatible with the industry-standard Sound Blaster. It worked perfectly with all the games with which I tried it. as well as with Windows, using the Sound Blaster setting. And like Windows, many games now directly support the Thunder Board as well. I've seen a few reports of problems with Falcon 3.0 and the Thunder Board in some systems, but it worked fine with Falcon when I tried it. Hardware compatibility is no problem; the board functioned perfectly in both a 16-MHz 386SX and a 66-MHz 486DX2 system and even in an Amiga 4000 with a 386SX Bridgeboard. Dynamic filtering on the digital inputs and outputs makes for sound about as clean and crisp as you can expect from an 8-bit sound system.

You can edit digitized sound files using the bundled Thunder Master software. The real fun comes, though, when you plug a microphone into the input jack and sample your own sounds. Your kids will love it, for example, if their own voices welcome you to Windows when you start up your system. You can save disk space by compressing sounds at a 2:1,3:1, or 4: 1 ratio; the Thunder Board will decompress the sounds in realtime.

If you're looking for a card just to play with sampled sounds or add some background music to your games, a 16-bit card is probably overkill. For banishing beeps and buzzes, the Thunder Board is an 8-bit bargain. DENNY ATKIN

Media Vision (800) 845-5870 (510) 770-8600

Circle Reader Service Number 445

#### MICHAEL JORDAN IN **FLIGHT**

Air Jordan is flying Electronic Arts off the bench and into the middle of the action in the competitive sports game arena. Michael Jordan in Flight's cuttingedge technology makes it a championship-quality sports simulation.

The one-player game lands you in the thick of three-on-three action, directing Jordan and friends on their hometown team from Wilmington, North Carolina. You compete in exhibition or tournament games against seven fictional teams playing the country's hottest pickup basketball. Although informal in spirit, the action unfolds on a squeakyclean indoor half court, complete with all the professional trimmings: multiple camera angles, instant replays, highlight films, and sportscaster Ron Barr's end-of-game stats.

The designers depart from previous efforts in the genre with full-size animated players, digitized from live-action video. No rotoscoped, computer-enhanced characters here; you see and



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control photorealist images of actual players. The technique is visually stunning, but the task of simultaneously animating six digitized figures weighs heavily on system resources. Don't expect smooth play on anything less than a 33-MHz 386 machine with as much expanded memory as you can muster. The game also offers limited support for SVGA cards. Hi-res mode looks great, but it's virtually unplayable on an average PC, with characters moving as if alued to the floor.

True to its roots in street basketball, gameplay is mostly improvised, featuring only four preset offensive plays. Unfortunately, there's no provision for designing your own shots. You can control either Jordan exclusively or the player closest to the ball. Jordan's trademark moves are all here, but unless you're next to the bucket, control is limited to generic passing, jumping, and attempted steals. One of the game's best attributes is its crisp sampled sound effects, including Jordan's own colorful digitized asides during the heat of play; "Thanks for the Nike poster!" he exclaims when he makes a particularly pretty jump shot.

Given the power to drive its high-end graphics engine, Michael Jordan in Flight soars beyond any hoops action seen on the computer screen. However, the game's scant features and unfinished, experimental feel suggest that the best may be coming in Michael Jordan II.

SCOTT A. MAY

Electronic Arts (800) 245-4525 \$69.95

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# THE OREGON TRAIL

Migrating westward across the United States in the 1840s was a hardship few of us today can appreciate. When you consider the treacherous trail through the sions to make and hardships to overcome before reaching Oregon's Willamette Valley.

On the trail, you must hunt for food, cross rivers, repair your wagon, rest in order to heal sick companions, fight bad weather, and handle any number of other

ions, fight bad weather, and handle any number of other

Congratulations!
You have reached the Willamette Valley.

The Oregon Trail, one of the first educational computer games, is available in a new VGA edition.

wilderness between Missouri and Oregon-a trail fraught with danger, sickness, and even death-it's a wonder this great country ever managed to grow from sea to shining sea. While the trip today is as easy as hopping on the interstate, MECC's Oregon Trail (in a new deluxe VGA edition) on your computer will let you experience the trials that the pioneers faced on the 2000mile journey across America's unsettled frontier.

You start your journey by assigning your character one of eight occupations; your choice determines the game's overall difficulty. Then it's off to Matt's General Store, where you purchase supplies, including oxen, clothes, bullets, food, and various wagon parts. Once supplied, you hit the road and hope for the best. You and your four companions will have many deci-

difficulties. Disasters, too, need to be dealt with. You never know, for example, when a fire in your wagon may destroy supplies or when death will strike sick companions. Luckily, you can stop at various landmarks and forts along the way to rest and stock up on supplies. The online guidebook provides historical background on these nineteenth century locales. In addition, you can talk to people during your travels to gather information.

In this new VGA edition, the Macintosh-like displays feature a colorful miniwindow that shows a map of your journey or a graphic of the current landmark. Digitized sound effects have been added to the program, although they're sparse; they include simple effects such as gunshots and wagon wheels breaking. Still, the new graphics add much

to a classic educational game, a game that's easy for older elementary-school children to learn and interesting enough for adults to enjoy as well.

CLAYTON WALNUM

MECC (800) 685-6322 (612) 569-1500 \$59.95

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# A PLACE FOR MY STUFF

A Place for My Stuff is just what its name implies: a place (relational database) for your stuff (random information you want to store). Since it's not a full-blown database like Access or FoxPro, it requires no programming knowledge. This makes it easier to use but more limited than a more structured database.

Adding an entry to a database is as simple as typing a sentence. The program converts the sentence into grammatical elements and places the words in their appropriate fields, cutting the extraneous verbiage. For example, you could activate the sentence template and type 101 Dalmatians is a great video for kids, create a new category called Videos, and start tracking your videotape collection. Or you could use the name-and-address template to enter address data.

You can view your records one at a time in detail or in a list format. You can set filters to search for items that share common characteristics. Unrelated items can be linked by clicking on them in a list and saving them as a group.

Reports are easier to format than in a traditional database, but they aren't com-

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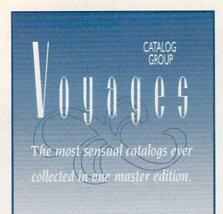
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#### Not Recommended for Younger Viewers Due to Realistic Depictions of Violence

Wolfenstein 3-D requires an IBM or 100% compatible computer with 640K RAM, a VGA graphics card, and a hard disk drive. Extended memory (XMS), expanded memory (EMS), joystick, and mouse are optional. IBM is a registered trademark of International Business Machines, Inc. Sound Blaster is a registered trademark of Creative Labs, Inc. AdLib is a registered trademark of AdLib, Inc.



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#### **REVIEWS**

pletely automatic. You'll still have to define headers and footers, margins, column width, and spacing.

A Place for My Stuff uses a standard Windows interface, with pull-down menus, dialog boxes, and pick lists for commonly used responses. Data can be imported from and exported to other cop-



A Place for My Stuff lets you create database entries using normal sentences.

ies of the program, or in ASCII format.

By sacrificing power and customizability for simplicity, A Place for My Stuff cripples itself. Its sole notable advantage over low-cost PIMs lies in its ability to interpret complete sentences. But even users who appreciate not having to learn a database language might be frustrated its limitations.

Still, it's capable at what it does. It's easy to use, once you understand its structure. And if you're more enamored with writing a sentence and viewing data in that format than more rigid database screen shapes, it may be a good choice for you, especially with its low street price of about \$79.

Quadrangle has compiled several add-on databases that contain information on topics like PC software and hardware, vacation and travel, and sports. These range from \$9.95 to \$17.95, and, if they sound useful to you, might make A Place for My Stuff the right place for your database information.

Quadrangle (313) 769-1675 \$129

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#### **COMPUTERWORKS**

If you're mystified by your computer's inner workings, curious about the many boards and peripherals you can add to it, or interested in the development of computers, Software Marketing's ComputerWorks can be your graphic guide.

ComputerWorks packs diagrams of

everything from connector cables to motherboards, a time line that starts with the abacus and ends with the latest microprocessors, and loads of information on related topics. You can browse through screens of text and illustrations, use an index to locate specific topics, or follow lesson plans. Many text entries include hypertext—highlighted words or phrases on which you can click to see a definition



ComputerWorks is an online reference that tells you all about your computer.

or a cross-referenced illustration.

With so much information, getting through ComputerWorks in one sitting would be a daunting task. It's best suited for browsing in your spare time, and its tools include bookmarks to keep your place or mark a screen to which you want to return. A button bar at the bottom of the screen makes navigation a breeze. After you've spent some time with the program, you can test what you've learned by taking one of its eight topical quizzes. (Watch out for the history quiz!)

You can print any of the text or graphics from within the program or export them for use in your word processor or desktop publishing software. The graphics are colorful and detailed and would be useful as computer hardware clip art.

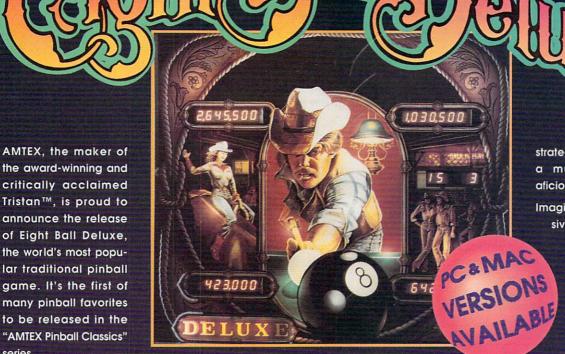
Unfortunately, ComputerWorks' many graphics make it a fairly large program to keep on your hard drive, taking up about 5MB. Installation is easy and relatively quick, so you can take the program off your hard drive after you've gone through it a few times and reinstall it if you need it later.

ComputerWorks is filled with useful information, but it won't take the place of a manual or reference book. One mail-order outlet was selling it for \$55. That seems a bit pricey compared to a good book, particularly if you're the only one who will use it. But Computer-Works is a good introduction to computers, and for a teacher or family, it might prove more flexible and accessible than most introductory books. Although it contains an abundance of information. ComputerWorks is general



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# **AMTEX**

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enough in scope that it won't be dated by the time you get it installed.

PHILLIP MORGAN

Software Marketing (602) 893-2400 \$79.95

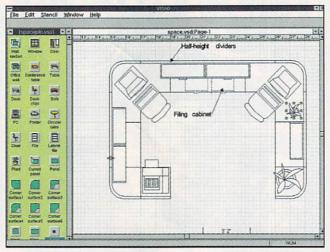
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#### VISIO

Few tasks are more daunting to nonartists than having to create good-looking business or technical graphics. For all their claimed ease of use, most drawing programs-with their multiple tools, drawing modes, and nested sets of features-aren't easy at all. Worse, with most applications it takes way too much time to create anything more complex than a pie chart, and if you're not artistically inclined, the results are likely to look amateurish.

Visio is one drawing program that does just what it says: It makes creating business graphics a snap. The key to Visio's simplicity is its drag-and-drop approach to drawing. If you've ever used technical-drawing stencils-those green plastic sheets with cutouts of flow chart symbols, architectural shapes, and the like-then you already know how to use Visio. Visio has its own versions of those plastic stencils, with intelligent symbols (called SmartShapes in Visiospeak) for engineering schematics, flow charts, organization charts, network layouts, and 11 other common types of drawings. Additional stencils are available from Shapeware, or you can create your own.

The stencil floats in a window next to the main drawing area, and all you have to do is drag the desired Smart-Shape from the stencil to its



You don't have to be an artist to create impressive charts and pictures with Visio, thanks to its shape library.

place on the drawing. You can drag the shapes around, group them, add text, and attach connecting lines that extend and contract as adjustments are made to the drawing. Each SmartShape is backed by a minispreadsheet that defines the shape's geometry, text style, and other characteristics. Spreadsheet users can program shapes to perform and display calculations. Though Visio lacks most of the mode-based drawing tools contained in other drawing programs, it does have a smart pencil tool that knows when you are trying to draw a straight line or a curve and creates a geometrically perfect line.

No professional artist will want to use Visio as his or her only drawing tool. It lacks many high-end features, such as 24-bit color and PostScript support, gradient blends, and object blending. But if you have to crank out lots of technical drawings of low-to-moderate complexity and don't want to spend a lot of time or money doing it, then Visio is for you.

Shapeware (206) 467-6723

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#### **SHERLOCK**

MS-DOS has seen many improvements over the years, but unfortunately, it's still saddled with the painful filename limitation of eight-plusthree characters. When you create a file, you must make up some clever abbreviation to remind yourself of the file's contents. But a few months later, you probably can't remember whether you stored your expense report as M07EXP.EXC or EX-PRPT7.EXC and you're forced to go on a tedious search.

Sherlock is designed to solve this problem. It organizes your hard disk files just as you would your paperbased files in an office. Files go into folders, folders go into drawers, drawers go into cabinets, and cabinets go into offices.

The program runs under Windows and comes up as a TSR when you use the Save As command from a

Windows application. I used Sherlock often with Lotus Ami Pro, for example. The Sherlock Save card asks you for a document description, which can be many words; document type (memo, car expenses, or anything else you like); contact; user name; format; and keywords. Most of these are optional, and when you finish the task, the program asks where you wish to store the document.

The first time through, you name an office, a file cabinet, a drawer, and a folder. Each of these names can consist of several words. Sherlock remembers these, and when you save your next document, it offers you your earlier system, which you can change or supplement at any time.

The fun comes when you wish to retrieve a document. Perhaps you've forgotten which folder or drawer or cabinet you used. Sherlock will find documents for you on the basis of words in the description, document type, or keyword list and present you with a list of those documents which meet your specifications. Choose one, and Sherlock will tell you where it is filed and open it if you wish. (The newest release also supports standard MS-DOS filenames.)

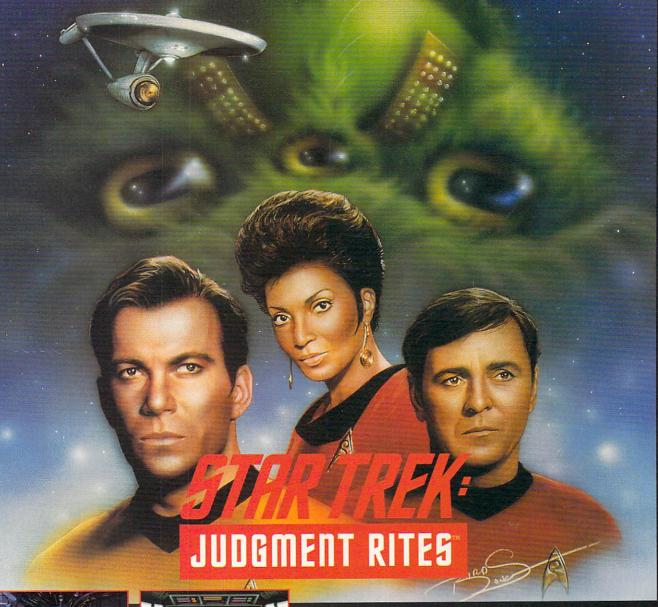
Sherlock is a very good program. It's fast, friendly, and easy to learn. The manual is well written, and the tutorial is very helpful. Sherlock offers a solution to your filing problems that's better than a file clerk—and much better than trying to remember MS-DOS filenames.

2010 Software (800) 952-2314 \$139

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#### **MYSTERY AT THE MUSEUMS**

Washington's massive Smithsonian Museums form a fantastic backdrop for learning in Mystery at the Museums, Binary Zoo's educational whodunit. In addition to building logic skills and engaging in creative thinking, players are exposed to a wealth of information culled from the Smithsonian's 12 worldfamous museums.

Your guide on this whirlwind tour is Edison, a squeaky-voiced little chap whose hair, complexion, and clothing color can be modified by the player. After inspecting your choice, Edison responds, "Cool!" He then leads you to the office of Smitty, a private detective in charge of a most peculiar case: It seems that somebody has been playing hide-and-seek with the museum exhibits, misplacing dozens of treasures and artifacts. Your job is to visit each museum and, by solving a puzzle, locate a missing exhibit piece. A presidential visit, scheduled for 10:00 the next morning, adds urgency to your quest.

The program targets ages 7 to 14 and does a tremendous job of satisfying this broad range with eight progressively challenging skill levels. Advanced players can also create and save their own custom levels with the icon-driven game editor. The 16 puzzle types are both entertaining and surprisingly sophisticated. The puzzles cover memory, logic, mathematics, spatial relationships, pattern matching, and general knowledge. Along the way, almost as a bonus, players are treated to tidbits of Smithsonian knowledge, carefully

disquised as puzzle pieces, clues, and solutions. All the puzzles offer multiple levels of difficulty, assuring longterm interest for all age groups. Also worth noting are the context-sensitive help screens, responsive mouse controls, and excellent audiovisual feedback.

Another hallmark of Bina-

#### **V FOR VICTORY:** MARKET GARDEN

Market Garden, the third game in Three-Sixty Pacific's V for Victory line, is more likely to open up the line to a wide audience than either the hedgerow slugfest of Utah Beach or

give the game a long life; and the ability to delegate authority to your staff. Better Al means you'll face a more rigorous challenge than in earlier VfV games. This is on top of the substantial difficulty of the Market Garden campaign. Rather than offering set-

piece battles in the fashion of the earlier two games, Market Garden forces more multidimensional thinking, as players have to deal simultaneously with several minifronts—sometimes widely separated along the narrow corridor—operating under a variety of different circumstances and pressures.

the series. Among V for Vic-

tory's strengths are ease of

use, with an intelligent click-

and-drag system for moving

units: an efficient toolkit of

micromanagement controls;

shimmering Super VGA dis-

plays (war games simply

don't look any better than

this); an array of what-if var-

iants and scenarios that

Market Garden is every bit as solid as its predecessors, and when Three-Sixty upgrades the game, it will become the first in the series to accommodate modem play. My only misgiving is that Market Garden and its brethren are essentially board games played on a computer, complete with hexes, phases, and turns. This seems to slight the medium's potential for realistic. free-flowing, simultaneous combat. Still, as far as computerized board games go, you'd be hard-pressed to find one smarter and betterlooking than Market Garden. PETER OLAFSON



V for Victory: Market Garden is one of the best computerized implementations of classic board wargames yet.

ry Zoo products is the magnificently rendered graphics, available in regular 256color VGA or crisp high-resolution Super VGA. The game's 30-plus screens unfold like an exceptional artistic vision.

Mystery at the Museums takes its distinct style from Artech Digital Entertainments' Rick Banks and Paul Butler. best known for their long, prolific association with Accolade. The designers have definitely found their creative niche at Binary Zoo, and this program is one of the best works of their careers. SCOTT A. MAY

Binary Zoo (518) 298-2470

Circle Reader Service Number 452

the relatively obscure cauldron that was Velikive Luki.

Market Garden was an ambitious plan to plant the Allied flag on German soil before the winter of 1944-45 and so speed the end of World War II. The problem: Paratroopers assigned to seize a series of six critical bridges across Holland in September 1944 weren't aware of the presence nearby of substantial German forces-including two SS panzer divisions—until they were forcefully made aware of them. The results were heavy losses, retreat, disaster. This battle was the subject of the popular film A Bridge Too Far.

Market Garden shares the same basic look and feel of its predecessors in

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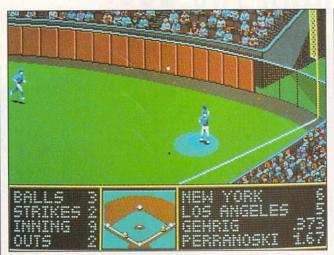
#### TONY LA RUSSA BASEBALL II

Tony La Russa Baseball II includes just about every element of America's favorite pastime except for the seventh-inning stretch. You can play it as a statistical simulation, a full-fledged action game, or anything in between. One of the most complete baseball simulations available, Tony La Russa Baseball II is packed with over 15MB of graphics, sound, and statistical data.

Like most state-of-the-art sports games, La Russa II lets you choose between a strategic or action game, with either the computer or you controlling the action. However, La Russa II also lets you assign certain tasks to the computer while keeping others for your control. For example, you can give the computer fielding, throwing, and running duties, so you need handle only the pitching and batting.

If you prefer a hands-on approach to managing a baseball team, you can create your own teams. Management capabilities include editing player statistics, transferring players between the active roster and the reserve list, setting the pitching rotation and batting order, making defensive assignments, and more. An important enhancement in La Russa II is the manager profile editor, which lets you assign a detailed managing style to the computer manager. The manager's style is divided into five strategy categories— Lineup & Rotation, Pitching, Batting, Defense, and Base Running—each of which contains several strategies which you can edit.

Whether you want to play a single game against a



SSI's Tony La Russa Baseball II lets you assign certain tasks, such as fielding, throwing, and running duties, to the computer.

friend or compete against the computer for the pennant throughout an entire season, La Russa II delivers. You can even put together vour ideal fantasy teams and leave the computer to figure out who'll win the World Series as your game statistics flash by and the outcome of each game is calculated. In less than 20 minutes, every pitch, hit, strikeout, and run in the season blazes through your computer's memory.

Adding to the simulation's realism are La Russa II's nicely rendered graphics and good use of digitized sounds. Throughout each game, you'll watch convincingly animated players race about the field, as well as hear the announcers comment intelligently on the plays. Tony La Russa Baseball II is the next-best thing to having a ballpark in your living room.

CLAYTON WALNUM

Strategic Simulations (800) 245-4525 (408) 737-6800 \$59.95

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#### **KELLYREST**

If you spend several hours each day at your computer, the thought of developing carpal tunnel syndrome, a widely known repetitive stress injury, can be frightening. An ergonomically designed workspace can greatly decrease your chances of getting this painful condition.

KellyRest, a cushioned wrist rest that slides right under your keyboard, has made typing much more comfortable for me. It extends about three inches out from the front of your keyboard to keep your hands and wrists at a comfortable position while working. The wrist pad is attached to a nonslip metal backing which sits under your keyboard and keeps the wrist pad from moving.

KellyRest acts as a buffer between my wrists and the edge of my desk, and it forces me to keep my hands and arms in a better position for preventing repetitive strain injuries. Although your wrists are supposed to stay elevated when you type, when you do lower

them, it's much nicer to hit a Naugahyde pad than the hard wood edge of a desk.

KellyRest is effortless to install; just slide it out of the box and under the front edge of your keyboard. There's nothing to attach. Its quality construction is indicated by its four-pound weight. The standard model is 1 inch high, 3 inches deep, and 19 inches wide, and should accommodate a standard AT-style keyboard. Kelly can create custom configurations as well.

As a measure of prevention of the potentially painful reality of carpal tunnel syndrome, this wrist rest is of great comfort both mentally and physically. If you're looking for the peace of mind that comes with a healthy working environment, KellyRest is a good start.

POLLY CILLPAM

Kelly Computer Supplies (800) 447-2929 \$39

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# LOST SECRET OF THE RAINFOREST

Vibrant graphics and sounds make Lost Secret of the Rainforest a highly entertaining product. And with the freedom to explore new worlds and develop creative solutions to problems, children should find this latest addition to the Sierra Discovery Series highly educational as well. Ecology can be fun.

As Adam Greene's adventure begins in Peru, both onscreen and manual directions help familiarize children with the program and advance them through the first stage. Adam learns that he's been chosen to save the South American rainforest and begins searching

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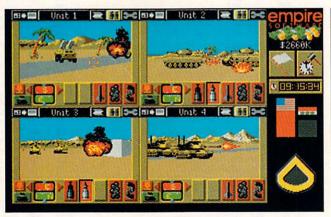
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for facts that could help stop its destruction. Your child must talk to people and animals, read their responses, and collect items that will help solve the forest's mysteries. The Ecorder, a hand-held computer, stores information about each animal and plant species, about ecological disasters that threaten the forest's existence, and about the history and way of life of South America's indigenous people. The Ecorder also allows your child to review the facts, take quizzes, and print the recorded information for reference.

Using the information collected with the Ecorder, your child finds ways to advance through each level. Because the game doesn't provide instructions for solving problems, your child must explore the area and use logic and imagination to solve the puzzles, which include saving an egg from a nest fire and getting past a swarm of insects. By encouraging creative thinking, Lost Secret of the Rainforest sets itself apart from other educational games. However, the lack of instructions can be challenging sometimes, since your child is stuck in a single setting until each problem is solved and the next path is revealed.

Lost Secret of the Rainforest uses 256-color VGA to create the detailed backdrops, which include tree canopies, caves with twisting tunnels, and a village of native people. Sierra also uses 16-bit audio to create background music, realistic voices, and the natural sounds of the rainforest. The package comes with both MS-DOS and enhanced Windows versions and can be operated using mouse, joystick, or keyboard.



You can control up to 16 tanks simultaneously in heavy battle with War in the Gulf's flexible quad-view interface.

Although the game targets children age 10 and older, young users may find some of the problems frustrating; however, the thrill of solving a difficult problem is rewarding and may encourage them to continue.

Sierra quarantees that your child will gain new information while playing Lost Secret of the Rainforest and provides a full refund if you aren't convinced of the program's learning value.

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#### WAR IN THE GULF

Kuwait, 1995. Saddam Hussein remains at the helm of Iraq's ship of state. Incidents between Israel and the Palestinians have raised the level of tension in the Middle East. Saddam believes the time is right to retake Kuwait.

This is the frighteningly believable scenario of one of the best battlefield simulators ever, War in the Gulf. Your assignment is to lead Team Kuwait, a crack team composed of American Desert Storm veterans hired by Kuwait's emir. You're commanding a tank assault to repel the invading Iragi Republican Guard. Two Kuwait oil fields must be retaken, and the Iraqis must be pushed back across the border.

The emir has provided over \$55 million to outfit Team Kuwait. Available weapons include the M-1 Abrams battle tank, the M-113 armored personnel carrier, the M-2 Bradley infantry fighting vehicle, and the M-901 TOW missile launcher. Each vehicle may be equipped with your choice of four different weapons: | Circle Reader Service Number 457

HEAT, SABOT, TOW, and SMOKE missiles.

You command 16 vehicles, which are divided between four platoons. A fourway split screen lets you see the battlefield from the perspective of each team. If the action gets too hot for one team, you can expand its view to full-screen so you can see more of what's going on. Thermal imaging makes night fighting possible, and you can call up an overhead map showing your forces and the Iraqi formations.

Controlling 16 tanks at once isn't easy, but who said war is simple? If you want to hone your battlefield strategy skills, War in the Gulf is worth a look. It is similar Empire tank games, such as Team Yankee, but it exhibits all the positive characteristics of a program that's been fine-tuned and perfected over time. My tanks to ReadySoft for importing this fun game.

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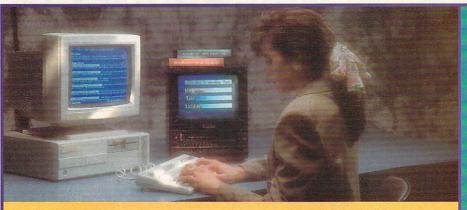
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The bundled DOS and Windows software makes the LabelWriter II Plus a pleasure to use. I did most of my design work with the Windows version, which includes an address book, a list book (a minidatabase for nonaddress-type label entries), and Designer, a miniature desktop publishing program just for labels. The address and list books can



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The DOS software has sim-

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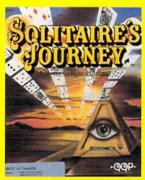
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### New technology launches wireless speaker revolution...

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needed between you and your stereo. One

transmitter operates an unlimited number

Recoton's transmitter sends music through walls

to wireless speakers over a 75,000 square foot area.

The headphones and speakers have

ter, giving you a full 150 foot range.

of speakers and headphones

Recoton gives you the freedom to lis-





Breakthrough wireless speaker design blankets your home with music.

By Charles Anton

f you had to name just one new product "the most innovative of the year," what would you choose? Well, at the recent International

Consumer Electronics Show, critics gave Recoton's new wireless stereo speaker system the Design

and Engineering Award for being the "most innovative and outstanding new product."

Recoton was able to introduce this whole new generation of powerful wireless speakers due to the advent of 900 MHz technology. This newly approved breakthrough enables Recoton's wireless speakers to rival the sound of expensive wired speakers.

Recently approved technology. In June of 1989, the Federal Communications Commission allocated a band of radio frequencies stretching from 902 to 928 MHz for wireless, in-home product applications. Recoton, one

of the world's leading wireless speaker manufacturers, took advantage of the FCC ruling by creating and introducing a new speaker system that utilizes the recently approved frequency band to transmit clearer, stronger stereo signals throughout your home.

Crisp sound throughout your home. Just imagine being able to listen to your stereo, TV, VCR or CD player in any room of your home without having to run miles of speaker wire. Plus, you'll never have to worry about range because the new 900 MHz technology allows

stereo signals to travel over distances of 150 feet or more through walls, ceilings and floors without losing sound quality.

One transmitter, unlimited receivers. The powerful transmitter plugs into a headphone, audio-out or tape-out jack on your stereo or TV component, transmitting music wirelessly to your speakers or headphones. The speakers plug into an outlet. The one transmitter can broadcast to an unlimited number of stereo speakers and headphones. And since each speaker contains its own built in receiver/amplifier, there are no wires running from the stereo to the speakers.

#### Full dynamic range. The speaker, mounted in

a bookshelf-sized acoustically constructed cabinet, provides a two-way bass reflex design for individual bass boost control. Full dynamic range is achieved by the use of a 2" tweeter and 4" woofer. Plus, automatic digital lock-in tuning guarantees optimum reception and eliminates drift. The new technology provides static-free, interference-free sound in virtually any environment. These speakers are also self-amplified; they can't be blown out no matter what your stereo's wattage.

Stereo or hi-fi, you decide. These speakers have the option of either stereo or hi-fi sound. You can use two speakers, one set on right channel and the other on left, for full stereo separation. Or, if you just want an extra speaker in another room, set it on mono and

listen to both channels on one speaker. Mono combines both left and right channels for hi-fi sound. This option lets you put a pair of speakers in the den and get full stereo separation or put one speaker in the kitchen and get complete hi-fi sound.



These wireless stereo headphones have a built-in receiver.

Factory direct savings. Because of our commitment to quality and our factory direct pricing, we sell more wireless speakers than anyone! For this reason, you can get these speakers far below retail with our 90 day "Dare to Compare" money-back guarantee and full manufacturer's warranty. Through this limited time offer, the Recoton transmitter is only \$69. It will operate an unlimited number of wireless speakers priced at only \$89 and wireless headphones at \$59 each. So take advantage of this special offer to fill your home with music. Your order will be processed in 72 hours.

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Volume

2" tweeter Individual left, right & mono switch and Individual bass boost control (on back) Size: 9"H x 6"W x 5.5"L Signal-to-noise ratio: 60 dB Channel Separation: 30 dB Two-way bass reflex design

Don't take our word for it. Try it yourself. We're so sure you'll love the new award-winning Recoton wireless speaker system that we offer you the Dare to Compare Speaker Challenge. Compare Recoton's rich sound quality to that of any \$200 wired speaker. If you're not completely convinced that these wireless speakers offer the

outstanding sound quality as wired speakers, simply return them within 90 days for a full "No Questions Asked" refund.

Recoton's Design and Engineering Award



# How to get surround sound without buying the theater...

An amazing new surround sound decoder turns your existing stereo into a five channel home theater.

The Secret of Surround Sound

'90's because it adds "depth" to stereo sound,

giving you the home theater experience. Simply

stated, it makes you feel like you're actually at a

than the two channels. And that's the beauty of

the Dynaco QD-1, it provides five channels from

ically designed to integrate with the QD-1 de-

coder. You may also need our center channel

speaker, the A10-V, if your two front speakers are

more than eight feet apart. Adding this fifth

speaker, or center channel, helps keep dialogue

and important localization cues centered. So you

To "fill a room" with sound you need more

Dynaco offers rear channel speakers specif-

concert or a movie theater.

any two channel stereo or TV.

don't need to spend thousands

of dollars to enjoy sur-

THE PASSIVE

round sound.

Surround sound has become the rage of the

By Chuck Anton

s much as I love renting videos, it's just not the same as seeing a movie in a theater. I remember the first time I saw Top Gun. I nearly jumped out of my seat.when the planes flew overhead. One of the reasons movies seem so real is because they use surround sound to make it seem like you're ac-

tually there. Now, an incredible new device lets you use your stereo receiver to get that same surround sound in your home.

It takes more than just four speakers to get surround sound. You need to have some way of separating the signals. The new QD-1 Series II decoder does just that, and in a revolutionary way that rivals the best Dolby Pro-Logic and THX Systems available.

Wins over critics.
Noted audio critic,
Len Feldman, reviewed the QD-1 for the
September issue of
Audio Magazine. He
concluded that
"...the QD-1 produced a completely
accurate and realistic surround sound
experience from a variety of videotapes

and laser discs with Dolby surround encoding... the QD-1 delivers home theater sound the way it was meant to be heard."

Breakthrough 'L minus R.'
Back in the 1960's, Dynaco discovered that in addition to the right and left channels, a "difference" signal existed in a stereo recording, and aptly named it "L minus R." The QD-1 is able to de-

code Dolby Surround signals in a videotape or a laser disc because those spatial and depth cues have been matrixed into the "L minus R" portion of the stereo soundtrack. It does so passively, with no signal processing. What's more amazing, the QD-1 uses your main stereo amp to amplify the rear channels. You do not need any additional amplifiers!

#### Concert hall sound.

The QD-1 also decodes the ambience found in all musical recordings. This sense of space, or concert hall acoustics is present in all CDs and cassettes, especially live recordings. John Sunier of Audiophile Edition, a nationally syndicated radio program, says "If you're

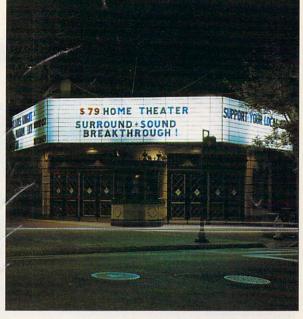
a surround sound buff who loves to listen to music, you'll find this \$79 passive black box superior to even the \$3000 THX or Dolby Pro-Logic processor."

Submerge

yourself in rich

ADVANTAGE

surround sound



**Quick and easy installation.** Hook up is easy. The QD-1 connects to the speaker outputs on your amp. The speaker leads then run to each of your four (or five) speakers. The rear channel speakers may be small; we

recommend the AW-1s at \$99 a pair. They come with mounting hardware, a keyhole slot for flush mounting, and have an attractive all-weather gun metal aluminum finish.



The AW-1 rear channel speakers integrate perfectly with the QD-1.

**Factory direct offer.** The QD-1 is so new you won't find it at your local department store. To introduce this product, we are offering it direct to you for a limited time special offer. By ordering now, you can save a substantial amount of money.

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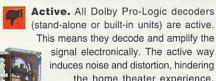
#### be iteard.

Passive. The QD-1 is passive, meaning it requires no AC current. It actually sounds better than active decoders, producing more clar-

ity, more detail, no noise, a greater sense of space, and zero distortion. This superior

distortion. This superior passive system is a break-through unique to Dynaco.

The QD-1 decoder makes your movies come to life. Surround sound brings the theater experience home to you.



the home theater experience.

This is an example where "more is less." Spending thousands on an active system will not give you the performance of the QD-1.



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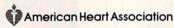
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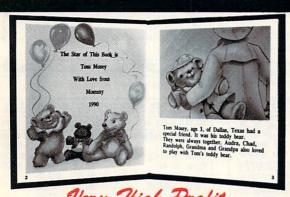


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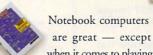
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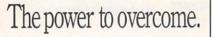
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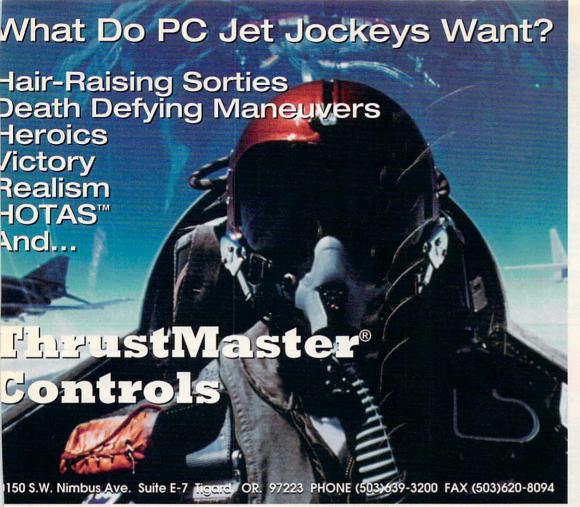


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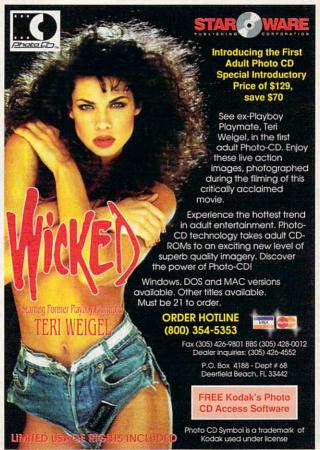
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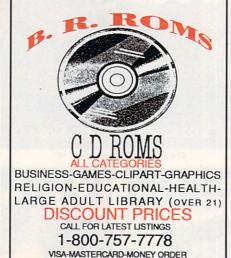
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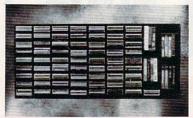
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#### Just the Fax

Faxes are hot items for the home right now—a trend that's seen dramatic growth in the past year and one that's likely to survive well into the future, according to BIS Strategic Decisions, a market research and consulting firm based in Norwell, Massachusetts. But the reason isn't based on price.

"The expansion of fax into the home is based on need, not because equipment prices are declining," explains Judith Pirani, director of BIS's Image Communication Systems Market Advisory Service. Business patterns are changing: More people are bringing work home in the evening, more people are telecommuting, and new business startups from the home are on the increase.

"The home is starting to emerge as the next important market segment for the fax industry. In fact, BIS believes sales of home fax machines will eventually overtake sales of business fax machines," Pirani says.

#### And More Facts

Three trends cited by Barbara Gilbertson, national sales manager for AT&T's Professional Development Center, were responsible for the organization's whopping 39-percent increase in students during the first half of 1993—and they're likely to affect *your* business future as well.

First, a large number of offices are changing to the Windows environment and Windows versions of software.

Second, an increasing number of companies are putting their salespeople on the road virtually full-time by teaching them to use laptop computers to transmit orders and correspondence.

And third, companies are continuing to reduce the num-

ber of employees. Having fewer clerical employees means that more managers must prepare their own correspondence and their own data analyses, and that's generating a need for managers to learn more about using software.

#### Close, but No Chagall

But then, no one expected Chagall last summer when HSC Software of Santa Monica, California, held a showing of five artists' digital art collections at the Franklin Institute Science Museum's Cutting Edge Gallery in Philadelphia.

Known for its unique approach to presenting science and technology exhibits, the Franklin Institute's goal, according to gallery coordinator Edward Wagner, was to show museum visitors how the advent of digital technology is changing the face of what we call "art"—how artists have "used the computer as an avenue of unlimited exploration into new art forms and styles."

As part of the showing, HSC installed an interactive presentation describing the artists' displayed work and a painting program for visitors to try. After all, the artists used programs like Adobe PhotoShop and Fractal Design Painter-affordable software available to everyoneto create their original works. Wagner says the digital art show received excellent reviews and "really opened a lot of eyes to the power of today's computer-graphics pro-

#### Not the Time to Stock Up

It definitely wasn't a bull market. Milk cow was more like it if you sank a lot of funds into computer stocks this year.

According to the July 1993 "Software Industry Bulletin," published by Digital Information Group of Stamford, Connecticut, consumers were better off investing in stocks other than software for the first half of 1993.

"The stock prices of 61 publicly held software companies rose only 3 percent during that time—well behind the 6.5-percent jump in the Dow Jones Industrials Average and the 3.6-percent rise in the Standard & Poor's 500 Index," the report says.

Exceptions were companies that went public in the first six months: IntelliCorp showed the best performance with a 284.6-percent gain, Lotus gained 76.4 percent, and Adobe gained 96 percent in the first six months.

#### Girl Talk

What's the secret of Echo, a New York-based online service that sports a 37-percent female membership?

According to founder Stacy Horn, in an interview with the Village Voice, women are more comfortable with the conversations on Echo because 50 percent of the conferences are hosted by women—who set the tone.

Horn says other online networks designed by men turn women off because "women are not interested in the endless debate that some men like to engage in. They communicate in a way that women walk away from." Of course. men are still welcome on Echo, but they can't expect to "attend" all of the online conferences. WIT (Women In Telecommunications) and WAC (Women's Action Coalition) are two for women only. But don't feel left out, guys; MOE (Men On Echo) is available for men-only conversations. (Horn says MOE is "dead as a doornail"-apparently, the guys are more interested in what the girls have to say.)

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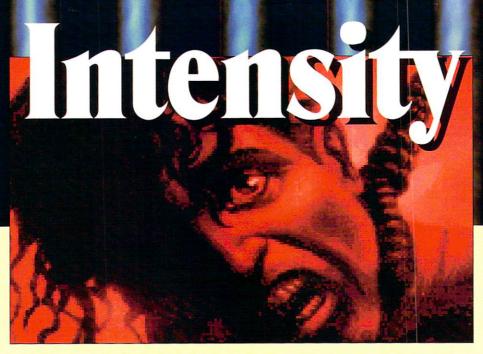
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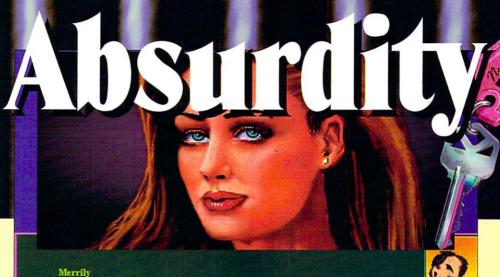


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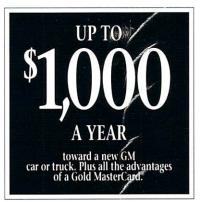


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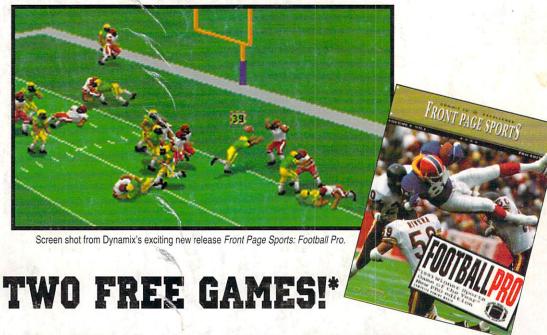
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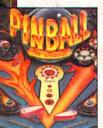
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